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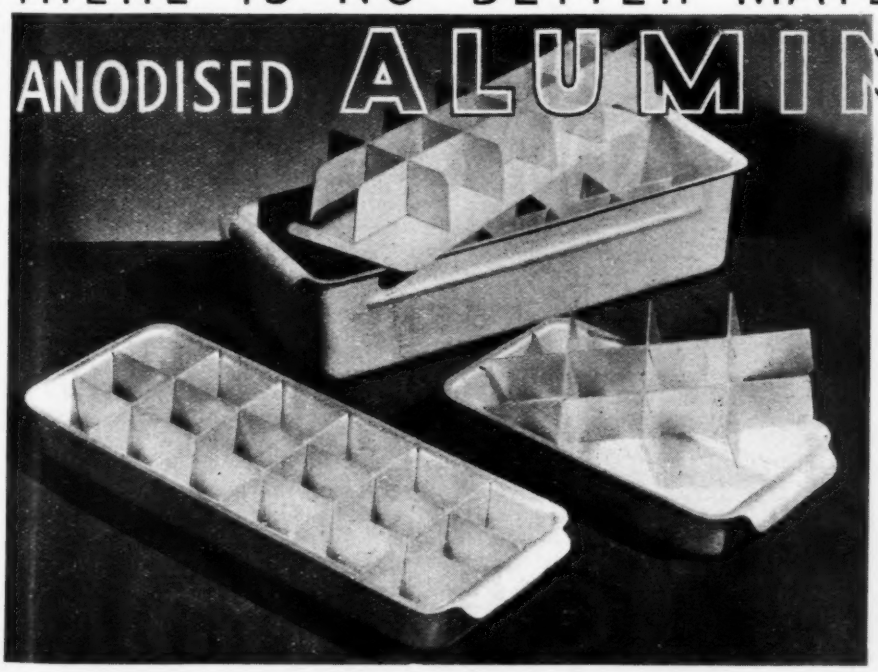

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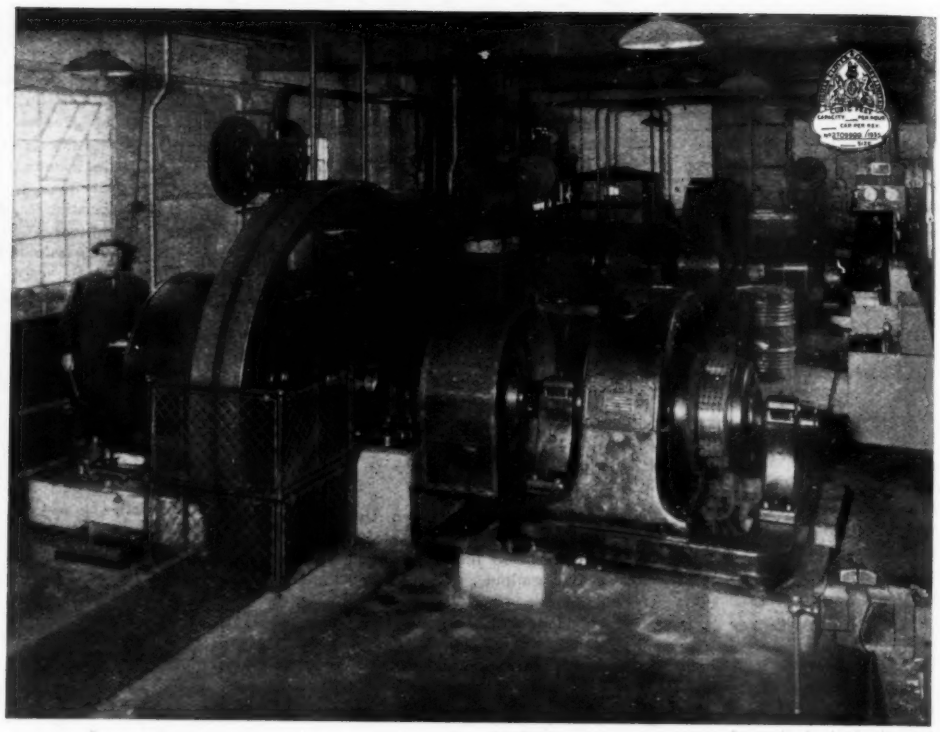

Gas in Industry

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Gas Journal

OCTOBER 16, 1935

Vol. 212. 87th Year No. 3778

Editorial Notes

Control of Gas Production

On several occasions of late we have pointed to what can be achieved by close and expert attention to the control of gas production from the entry of the raw coal into the works to the sending out of the purified gas to the town mains. At a time when so much thought, talk, and action is being directed—and quite rightly directed—to the selling of gas there is just a chance that the efforts of the " works man " may be undervalued. Admittedly the efficiency of the gas-making process has outstripped the efficiency of salesmanship in its widest sense, but this does not by any means imply that manufacturing efficiency has reached its highest standard. Every fraction of a penny by which the cost of the therm into holder can be reduced so obviously affects sales, and in our opinion there is a good deal yet to be done by those in control of plant. On a particular aspect of gas making we have had a good deal to say recently. We refer to the controlled cracking of the nascent gases evolved in the retort. Only a few weeks ago—in the " JOURNAL " for Aug. 28—we published an article by Mr. T. H. Prater, of Margate, on " Works Control," and not the least interesting part of that article was the author's outline of the results which have been achieved by the Isle of Thanet Gas Company in this direction. In continuous vertical retorts the effect of using " trunk feeds " of a simple design on the gas make per ton when carbonizing the same coals has been most marked. The volume of the unsaturated hydrocarbons in the gas per ton of coal has been increased by 40%, and this richer gas has allowed of greater steaming—to the extent of increasing the gaseous therms per ton by as much as 8%.

This matter of controlled cracking is dealt with by Mr. A. K. Collinge, of Preston, in his Presidential Address to the Manchester and District Junior Gas Association—an Address which emphasizes the benefits of detailed control and close supervision of the gas making process. A striking statement is that " the future development of production is in the hands of the chemist and physicist, and it lies in the better utilization of the hydrocarbons. The past history of carbonization makes it very evident that the engineer has made progress in advance of the chemist." To our mind there is a great deal of truth in this. It is not so very long ago that the engineer in the Gas Industry thought little of the chemist. In the capacity of engineer and manager he may have paid the chemist lip-service; he certainly paid him little else. It is more than fortunate for our Industry that this lack of co-operation has in recent years given place to a more general recognition, though a tardy one, that the chemist is of importance in what is so largely a chemical industry. We are sure that mutual understanding and appreciation between chemist and engineer are essential to the prosperity of gas and its allied products. Our view of the future development of gas production is that it lies not solely with the chemist, the physicist, or the engineer, but in co-operation between all three. It is significant that the Gas Industry is to play a large part in the Chemical Engineering Congress of the World Power Conference to be held in London next June. As indication of the subjects to be discussed we may mention the distribution of gas, manufacture of open grate fuel, blending, methods of heating carbonizing plants, low-temperature carbonization, washing and purification of gas, hydrogenation, benzole recovery, and the disposal of effluents. Are these subjects of vital importance to the Gas Industry to be solved by the engineer, or do they demand the co-operative efforts of engineer, chemist, and physicist?

The Chemist's Role

We flatter ourselves that we have done a certain amount to foster this co-operation, and we hope that our persistent advocacy of such co-operation will help Mr. A. J. Doran, of Edinburgh, to regard the prospects of the chemist in the Gas Industry less gloomily. " The manufacture of gas," says Mr. Doran in his Presidential Address to the Eastern District of the Scottish Junior Gas Association, " is undoubtedly a chemical one; and the technical control of the process is largely in the hands of the chemist, yet it is a general fact that the prospects of the chemist ever attaining administrative or research status are extremely meagre." Moreover, the chemical staff in the Gas Industry is largely recruited from Universities and Technical Colleges—they are, Mr. Doran implies, trained men. We quote further from Mr. Doran's

Address: " The chemist, by reason of his intimate knowledge of the actual manufacturing process, is indisputably qualified to undertake posts of a more responsible nature than usually fall to his lot. In general, the chemist finds that the path to these higher positions is beset with many obstacles and the status and remuneration offered do not adequately recompense him for the arduous and expensive training undergone. It would undoubtedly be an added stimulus to the chemical staffs were the various organizations to offer recognition of the part played by them in the Industry." We urge this recognition. We also maintain that when a young man emerges from the University or Technical College—from an atmosphere of scholastic calm into an all too harsh world of industry—his qualifications are but a ticket of admission. After the encouragement of his tutors he finds himself up against all sorts of difficult factors and harsh criticisms. He finds himself face to face with competition which includes that peculiar thing " personality." And all too often he is a little too sure of himself—a little inclined to regard his qualifications as possessing money value in themselves when all they constitute is a useful foundation on which to start work. In saying this we do not belittle in the least the difficulties which the chemist has had to face and still encounters in many quarters of the Gas Industry, but we feel the obstacles will lessen if the approach of the chemist and the approach of the engineer towards his work are based on the spirit of co-operation.

Discussing the question of the future of the Gas Industry, we said a few weeks ago that it depends on attracting to its service young men who can see ahead of them prospects of a successful career. The Industry is going through a phase of grouping, and many manufacturing plants are being shut down. To take full advantage of the savings which follow close control of gas production it is essential that well-trained staffs should be available; it is not yet universally recognized that the allocation of a technical man to any but the smallest carbonizing plant affects the cost of gas production by a negligible amount, and in fact usually saves money. No better training for ultimate positions of responsibility, we suggested, can be found than by the study of minute detail involved in the successful control of gas production; and we expressed the hope that one outcome of grouping would be an increase in the technical staffs for common service within the groups. The Industry must see that, whatever changes come about in its organization, opportunity and encouragement await those who are being trained for its service—" chemists " as well as " engineers." Certainly the chemist is encouraged at Edinburgh, where the Chief, Mr. Jamieson, is always keen to investigate at first hand problems affecting the Industry. Work is at the moment in progress at Granton on Scottish gas coals and cannel coals; and this work is being pursued in conjunction with the Fuel Research Board and other authorities. It is a question of being alive to the needs of to-morrow and of being in a position to cope with them.

Attention to Detail

To revert for a moment to the Address by Mr. Collinge, and again with special reference to the control of gas production, we are interested in the suggestion that the problem of increasing the yield of unsaturateds lies in the regulation of the temperature gradient to prevent over-cracking as far as possible, the fractional condensation of the tar, and the gasifying of the light tar in a separate cracking plant. " The production of gaseous hydrocarbons," says Mr. Collinge, " would then be under absolute control instead of being largely a matter of chance as at present." Much work has been done on the possibilities of employing creosote as a carburetting agent in water gas plant, but the results are not encouraging—still less so in view of the trend of the creosote market since that work was carried out and the results were presented to The Institution of Gas Engineers. Apart from cracking in a separate plant, however, there is a lot to be gained by controlled cracking in the retort itself, which implies the control of temperature within narrow limits and the regulation of such factors as time contact and the extent of heated surface.

There are one or two further points—and they are again concerned with control of gas production—in Mr. Collinge's Address to which we draw attention. The first concerns the selection of coal. As an indication of the care taken it may be mentioned that on occasion descent of the pit is made and samples are taken from the coal face, with a view to effecting improvement in the quality of coal purchased. In one seam of gas coal 3 ft. 4 in. in thickness the ash and sulphur contents in the top 12 in. were found to be 17·3% and 7·1% respectively, while throughout the remainder of the seam the amount of ash was 2·3% and sulphur 0·9%. Without going into any more detail, we may remark that, as a result of these and other tests the sum of £1,575 was saved on coal in 1934, improved coke was made, and a 15% reduction in the quantity of sulphuretted hydrogen in the crude gas was effected. Interesting, too, are the comments of Mr. Collinge on purification. Instead of adding heat to the gas prior to purification Preston prefers to reduce heat losses from the purifier boxes—to which end insulation is added to the underside of the covers. Purification costs amount to only 0·02d. per therm. There is one other point, and it is one which we have mentioned in these columns on several occasions—the financial advantages of selling gas of a calorific value the same as that declared. As far as Preston is concerned, Mr. Collinge observes that each B.Th.U. above the declared figure costs the Company £125 per annum. Strict control of calorific value every time!

More Statistics

To-day we supplement the statistics given last week from the Board of Trade Return by a glance at the Annual Report of the Secretary for Mines for 1934. We are not surprised, first of all, to note an increase in the production of " refined light oils " obtained at gas-works, coke ovens, tar distilleries, and low-temperature carbonization works. The total amounted to approximately 50 million gallons (the Report points out that the information received, from a wide field of enquiry, " may not be quite complete "). Of this, about 40 million gallons was returned as refined motor benzole. In addition, 14½ million gallons of motor spirit and naphtha was produced by the Scottish shale oil industry, making a total of 54½ million gallons of home produced motor spirit for 1934. Even if allowance be made for some difference due to a change in the bases of the statistics there was a substantial increase in 1934. Actually the increase over 1933, due mainly to the greater activity at coke ovens, amounted to more than 10 million gallons.

Available information, states the Report, indicates a wide variation in the yield of benzole per ton of coal carbonized at coke ovens. The average was about 3 gallons per ton of coal carbonized. A number of coke ovens return a higher figure, and if all works were brought up to the level of those showing the higher yields a substantial increase in the total production would result. As a matter of fact some coke ovens have recently installed new equipment with the object of in-

creasing the benzole yield. Coke ovens take out benzole from the gas produced representing 97½% of the coal treated. On the other hand, gas-works extract benzole—and this in spite of the growing tendency to extract—representing only 37½% of the coal carbonized. Moreover, the average yield of crude benzole is lower at about 2 gallons per ton of coal. In view of the advantages to be gained in most circumstances by stripping the gas for benzole, this figure of 37½% is surprisingly low. Of the total production of crude benzole at coke ovens, gas-works, low-temperature carbonization works, and tar distilleries, about 80% was obtained from the gas and 20% from the distillation of tar.

As for the production of creosote, this showed a marked increase. This again, of course, was to be expected. About 90 million gallons of creosote and heavy oils were made in this country from tars obtained from the carbonization of coal and from the shale industry—and, of course, with a larger proportion of motor spirit the output of heavy oils by the shale industry has fallen considerably. The 90 million gallons compares with 72 million gallons in 1933. One reason for this increase was the demand by Imperial Chemical Industries for creosote as a raw material for conversion into motor spirit by hydrogenation. The capacity of the creosote treating plant at Billingham is stated to be 50,000 tons of motor spirit, the total capacity of the plant being 150,000 tons per annum (100,000 tons from coal). This is roughly equivalent to a creosote demand of 15 million gallons if both plants are worked at full capacity. The Billingham plant was officially opened yesterday by Mr. Ramsay MacDonald, and an illustrated description appears on later pages of to-day's "JOURNAL."

Low-Temperature Carbonization

TURNING now to the figures relating to low-temperature carbonization we find that, as in the previous year, nine plants were in operation, but that the amount of coal carbonized decreased by 33,461 tons, or 10·5%—nearly the whole of this decrease occurring at one plant. In spite of this, however, the output of smokeless fuel shows a decrease of only 1,452 tons, or 0·7%, while the yield of crude spirit has actually increased by 26,261 gallons, or 3·5%. At those plants where the gas is scrubbed the average yield increased from 2·7 to 2·9 gallons per ton of throughput. The total coal carbonized was 284,242 tons, the yield of semi-coke being 220,793 tons. "There seems," observes the Report, "to be a possibility that in the future both of the older carbonization industries may explore more fully the possibilities of carbonizing at least a portion of their coal at lower temperatures, in order partly to produce a freer-burning fuel for the open domestic fire, and partly to secure the preference given to home produced motor spirit and heavy oil."

Among the mass of statistics contained in the Report (which is obtainable at H.M. Stationery Office, price 3s. 6d.) is the figure of 11 given as the number of gas fuel vehicles which have been licensed. These are comprised of one passenger vehicle and ten goods vehicles. Another item of interest to the Gas Industry is the progress being made in the preparation of coal for the market by means of mechanical cleaning processes. In 1934, nearly 87½ million tons of coal, or 39½% of the total saleable output, was mechanically cleaned, compared with 77½ million tons in the previous year. A very large proportion of the output of coal which is generally suitable for cleaning—*i.e.*, fine or small coal—is therefore now so treated. Washing continues to be the most used method of treatment, and 84% of the total tonnage cleaned in 1934 was so treated. On the other hand, the increase in the tonnage of coal which passed through dry cleaning plants in 1934 as compared with the previous year was 21%, compared with an increase during the same period of 11½% in the tonnage of coal which passed through washing plants. Especially large increases in the tonnages of coal treated by cleaning plants occurred in Durham, South Yorkshire, and South Wales.

We Need the Best

ONE feels almost inclined to apologize for carrying away a serious thought from so joyous a function as the annual dinner and dance of the Institute of Fuel, which took place last week in the Connaught Rooms, and was attended by over six hundred members and guests. Lord Rutherford remarked, during the after-dinner speeches, that the fuel industries were the daily bread of his audience, and that judging by what he saw it seemed to be very good bread. This, of course, is as it should be. There are no more important industries; possibly no industries with greater or more worthwhile problems to solve. To direct these industries and to unravel these problems, therefore, the best brains are needed. To secure these, the "daily bread" offered must be tempting. Is it invariably as tempting as it should be in the Gas Industry? We know that the answer, to be truthful, must be in the negative.

That is the serious thought, suggested by Sir David Milne-Watson, which emerged from the speeches, and may the hope be expressed that it will receive more widespread attention through the brilliance of its setting. For, as the speaker pointed out, a great deal of this brilliance even—that shed by the beautiful and multifarious colours of the dresses—owed its origin directly to the application of science to industry. Sir David was proposing the toast of "Science and Industry," and, leading up to the point which it is desired here to emphasize, he said that science is needed in order to keep industries up to date. Unless industries take care to remain closely allied to science, their time will be a very short one. Science he described as the soul or the spirit of industry, and he went on, "unless you keep that soul alive, you will die. Old industries must do all they can to secure the interest of the young scientist, because it has to be borne in mind that youth is naturally attracted by new things."

The Gas Industry need not be ashamed to include itself among the "old industries" referred to by Sir David. Let it therefore take to itself this serious thought. Is the Gas Industry doing all it can to secure the interest of the young scientist, from the "daily bread" point of view spoken of by Lord Rutherford? We all know that it is not. We all know that in far too many directions the Gas Industry does not hold out rewards which are likely to prove equally tempting as some other paths to the young scientist. The dark spots, it is true, are intermingled among shining examples. But that is not enough. The Gas Industry as a whole must do that which is necessary to secure the young scientists it needs. "Science is the soul of industry; unless you keep that soul alive, you will die." In the present day, that is probably true of any industry that can be imagined. It is incontrovertibly true of the Gas Industry. Without science, it will die. Untempting salaries and conditions, even if they may be supposed to help the balance-sheet temporarily, will do nothing to keep the soul alive.

Could there be a more insistent warning? It is a warning which, if heeded universally—and only if heeded universally—will ensure the flow to the Gas Industry of the science which it must have in order to continue along the lines of prosperity and progress during the times that lie ahead.

PERSONAL

The appointment is announced of Mr. HERBERT CLARK as Managing Director of Messrs. Tangyes, Ltd.

* * *

We learn from a local correspondent that Dumbarton Town Council has appointed Mr. EBENEZER SMITH as Assistant Gas Manager.

* * *

The wedding took place on Oct. 9 of Mr. DAVID L. DICKSON, the newly appointed Manager of Newport (Fife) Corporation Gas Department, to Miss Ann Turnbull, of Broughty Ferry, daughter of the late Mr. John A. Turnbull.

* * *

The Directors of the South Australian Gas Company have decided on a reorganization of staff, involving several new offices and appointments. In future the activities of the Company in all departments will, subject to the Board, be carried on under the control of a General Manager, and Mr. G. M. O'DEA, who was formerly Secretary and Business Manager, has been appointed General Manager and Secretary. In the place of the late Engineer (Mr. S. W. Durkin), Mr. S. R. PRESTON, formerly Assistant Engineer to the Company, has been appointed acting Chief Engineer.

* * *

We learn that Councillor JOHN GRICE TOOMS, M.Inst.C.E., A.M.I.Mech.E., has been nominated Mayor-elect of the Borough of Deal for the coming municipal year. Formerly Engineer and Manager at Waterford, in 1913, Mr. Tooms went to Buenos Aires as Engineer to the Primitiva Gas Company, returning home at the end of 1914. In 1915 he went to Oslo and, on retiring from that position six years ago, went to reside in Deal where he now controls a motor engineering business.

* * *

At the Autumn Meeting of the Cornish Gas Association held at Truro on Oct. 9, Mr. H. H. Hoare, of Falmouth, on behalf of the members, presented Mr. ROBERT MORTON, Engineer and Manager of the St. Austell Gas Company, with a silver cigarette case upon his leaving the county to take up a position at Dorchester. Mr. Hoare remarked that Mr. Morton had during his residence in the Duchy won their friendship, and while they regretted his departure they congratulated him upon his promotion.

OBITUARY

William Cranfield.

His many friends in the Industry will be sorry to hear of the death on Oct. 7, at Netherlea, Pickering, of Mr. William Cranfield, who was, until its recent cessation of publication, the Editor of *Gas News*, a position which he had held since September, 1924.

For many years prior to that, however, Mr. Cranfield's name and work had been known in the Gas Industry. In 1899 he gathered together a band of fourteen students in gas manufacture from Messrs. Dempster & Sons' well-known establishment at Elland and from the neighbouring gas-works. The after careers of those students have been noteworthy, and two or three of them are known by name in every gas-works. Interest in this work grew, and other classes were formed by Mr. Cranfield, best known of which were at the Technical Colleges of Bradford, Halifax, and Huddersfield, and at the Dewsbury Technical School. Heavy as this pioneer work was, with the travelling and late hours it involved, Mr. Cranfield always declared that it was one of the greatest pleasures and privileges of his life. He was brought into intimate touch with many sterling young men, and older ones too, who cheerfully made the surrender of time, money, and labour in connection with these classes.

On this was grafted in 1909 the Correspondence Classes in Gas Engineering and Gas Supply which Mr. Cranfield continued and which brought him a long succession of students from all parts of the British Isles and even from the Colonies. Preserving intact the secrecy of these correspondence classes, not even divulging names, Mr. Cranfield gained the confidence of the students and at the same time became acquainted with the varied experiences and difficulties associated with gas-works operations to an exceptional degree. His students have, indeed, reached some of the highest appointments the Gas Industry has to offer.

Mr. Cranfield played a large part in the early history of the Junior Gas Association movement. The Yorkshire Junior Gas Association was formed round the nucleus of his classes, and he was its President for the first two years, 1904-6, remaining a firm supporter of the Association so long as he was in Yorkshire.

Subsequently Mr. Cranfield became associated with *Gas News*, intermittently at first but finally laying aside his other activities and confining himself solely to this work. Among the few occasions when he emerged into publicity he addressed the Scottish Junior Gas Association in 1915, while he gave the William Young Memorial Lecture before the North British Association of Gas Managers in 1919, dealing by request with the subject of "Low-Grade Gas." In recognition of his valuable services to the Yorkshire Junior Gas Association, Mr. Cranfield was presented in March, 1915, with a testimonial from the members.

We of the "GAS JOURNAL" preserve many happy memories of the genial personality and wide learning, in all walks of life, of our late friend.

By the death of Mr. Cranfield the Gas Industry loses a true friend and one who gave to it devoted service. He was a man imbued with something like a missionary spirit in the cause of education, and he had the gifts, to a degree that is but rare, of the true teacher. His work in establishing the Yorkshire Junior Gas Association was an outstanding example of his faith and powers.

I had the happiness of knowing Mr. Cranfield for some forty years and held him in the deepest regard. His singleness of heart and his serenity of spirit can never be forgotten by those who knew him and their influence will endure.

ARTHUR SMITHELLS.

68, *Lissenden Mansions,*
London, N.W. 5.

* * *

We are informed by The Institution of Gas Engineers that the death of Mr. G. W. TOOLEY occurred on Aug. 2, 1935. Mr. Tooley was formerly Manager of the Rochdale Road Works of the Manchester Gas Department.

* * *

Mr. WILLIAM LAING, who died in Glasgow last week, was a former Manager of Dysart Gas-Works. After occupying the position for some years he went to Glasgow to take up an appointment in the Corporation Gas Department.

* * *

The death occurred on Sept. 1 at North Adelaide, Australia, of Mr. SAMUEL WESTALL DURKIN, Engineer of the Adelaide Gas-Works. Mr. Durkin was the youngest son of the late Mr. S. W. Durkin and brother of Mr. Frank Durkin, both former Engineers and Managers of the Southampton Gaslight and Coke Company.

The British Gas Federation

Annual General Meeting

The First Annual General Meeting of the Federation will be held under the Chairmanship of Sir David Milne-Watson, LL.D., D.L., at 3 p.m. on Monday, Nov. 4, at Grosvenor House, Park Lane, W. 1.

The business will comprise the presentation of the Annual Report and Accounts for the year 1934-35, the election of a President and Vice-Presidents, the appointment of an Auditor, receiving a list of the Council Representatives for the year beginning Jan. 1, 1936, a general discussion on matters of interest to the Gas Industry, and the transaction of other business of the Federation.

The Federation now comprises, of course, The Institution of Gas Engineers, the National Gas Council of Great Britain and Ireland, the British Commercial Gas Association, the Gas Companies' Protection Association, and the Society of British Gas Industries, and Rule V. provides *inter alia* that any member of a Constituent Body may attend and, subject to the ruling of the Chairman, speak at General Meetings of the Federation.

It will be appreciated that this Meeting is conveniently fixed for the eve of the Autumn Research Meeting of The Institution of Gas Engineers.

Annual Dinner.

Following the Annual Meeting, the second Annual Dinner of the Federation will be held at 7 p.m., also at Grosvenor House, Park Lane. At the dinner the President Designate, the Right Honourable the Earl of Dudley, M.C., T.D., D.L., J.P., will be supported by a large number of distinguished Official Guests, including Members of His Majesty's Government and of both Houses of Parliament, Government and Local Government Officials, Presidents of Kindred Associations, scientists, educationalists, industrialists, editors, and others prominent in public, professional, and business life.

We feel sure that members will unite in giving their support to this function, and in making it an unqualified success not only by their own attendance, but in entertaining such personal guests as might usefully be invited to be present. It must be emphasized, however, that applications for tickets should be returned *before Monday next* to Mr. J. R. W. Alexander, Secretary, Dinner Committee, The British Gas Federation, 28, Grosvenor Gardens, S.W. 1.

Council Meeting.

A meeting of the Council was held at 28, Grosvenor Gardens on Wednesday, Oct. 9—Sir David Milne-Watson, LL.D., D.L., Chairman of the Council, presided.

Arrangements were considered with regard to the First Annual General Meeting to be held on Nov. 4, particulars of which are given above. It was reported that notices of this Meeting had been sent to all members of the Constituent Bodies, and that it was hoped that a large and representative Meeting would result.

The arrangements for the Second Annual Dinner of the Federation were left in the hands of Mr. J. R. W. Alexander, and the hope was expressed that representatives of gas undertakings would be well represented. (Particulars of this are also given above.)

It was decided to nominate the Earl of Dudley for election as President at the Annual General Meeting.

The Draft Report and Accounts were submitted, amended, and approved for submission to the Annual General Meeting.

It was agreed that the Central Gas Advisory Board, which represented all the Constituent Bodies of the Federation, should now become a Committee of the Federation.

B.I.F., 1936.

At a meeting of the Gas Industries Section Committee on Sept. 25 it was reported that a complete Section of the Fair is now available for the Gas Industry. The Honorary Secretary of the Committee reported that there had been a considerable demand for space and that it was probable that the whole of the space allotted to the Gas Industries Section would be booked, and that the Section in 1936 would be larger than in 1934.

A general plan of the Section was approved and a recommendation was made that all exhibitors should adopt a standard scheme in the matter of stands, colouring, and lettering.

The question of a Joint Industrial Exhibit and a Central Information Bureau was also discussed, and referred to a Joint Committee of the British Commercial Gas Association and the Society of British Gas Industries. Preparations are also being made for the holding of a Joint Gas Conference during the period of the Fair.

The Institution of Gas Engineers

International Congress of Welding.

The Institution of Gas Engineers has accepted an invitation to be represented and present a Paper at the 12th International Congress of Acetylene, Oxy-Acetylene Welding and Allied Industries, to be held in London from June 8 to 13, 1936.

Harrison Memorial Prize.

We are informed by the Secretary of the Institution (Mr. J. R. W. Alexander) that, in accordance with the Trust Deed governing the Harrison Memorial Fund, the Selection Committee consisting of the Presidents of the Chemical Society, the Institute of Chemistry, the Society of Chemical Industry, and the Pharmaceutical Society, will proceed to make an award of the Harrison Memorial Prize in December next.

The Prize, of the value of about £150, will be awarded to the chemist of either sex, being a natural born British subject and not at the time over thirty years of age, who, in the opinion of the Selection Committee, during the previous five years has conducted the most meritorious and promising original investigations in any branch of pure or applied chemistry and published the results of those investigations in a scientific periodical or periodicals.

Provided that, in the opinion of the Selection Committee, there is a candidate of sufficient distinction to warrant an award of the Prize, the next award will be made in December, 1935. Applications, five copies of which must be submitted, should contain the following information:

(1) Name (in full).
(2) Age (birth certificate must accompany application).
(3) Degrees (name of University where obtained).
(4) Other qualifications.
(5) Experience.
(6) Titles of published Papers, with authors' names, including full references to publication.
(7) Where research was carried out.
(8) Testimonials or references.
(9) Any other particulars bearing on the application.

The Selection Committee is prepared to receive applications, nominations, or information as to candidates eligible for the Prize. Any such communication must be received by: The President, The Chemical Society, Burlington House, Piccadilly, London, W. 1, not later than Monday, Dec. 2, 1935.

Third World Power Conference.

The invitation of the United States Foreign Office, on behalf of President Roosevelt, to hold the Third World Power Conference in Washington, U.S.A., from Sept. 7 to 12, 1936, has been accepted by the International Executive Council.

The subjects to be discussed include Physical and Statistical Bases; Technical, Economic, and Social Trends; Organization of Fuel Industries and of Gas and Electric Utilities; Public Regulations; National and Regional Planning; Conservation of Fuel and Water Resources; Rationalization of Distribution; National Power and Fuel Policies.

Members of the Institution and others contemplating participation in the Third World Power Conference should inform the Secretary (Mr. J. R. W. Alexander), 28, Grosvenor Gardens, S.W. 1, in order that further particulars may be sent to them as and when information concerning the arrangements for the British Delegation becomes available.

International Gas Union.

Mr. C. Valon Bennett attended a meeting of the Council of the International Gas Union in Brussels on Oct. 15 and Mr. George Dixon, Mr. C. Valon Bennett (representing Colonel W. Moncrieff Carr), and Mr. C. A. Masterman (representing Mr. Stephen Lacey) respectively attended the meetings in Brussels on Oct. 1, 1935, of the International Committees set up by the International Gas Union to deal with Carbonization, Gas Charges, and the Testing of Gas Appliances.

News in Brief

A Five-Years' Lighting Contract has been secured by the Falmouth Gas Company for the whole of the Borough. The total number of lamps affected by the contract is 490.

A Special Order is intended to be applied for to the Board of Trade by the Minehead Gas Light and Coke Company, Ltd., with the object *inter alia* of extending the existing limits of supply.

By 56 Votes to 31 Glasgow Town Council on Oct. 10 decided not to re-open negotiations with Messrs. William Baird & Co. and Messrs. Dixon for the purchase of bulk supplies of coke oven gas from those firms.

For All Gas Used for Central Heating the Stratford-upon-Avon Town Council, on the recommendation of the Gas Committee, have decided to charge at the rate of 5d. per therm, less the usual terms of discount.

A Five-Years' Lighting Agreement has been entered into by the Whitburn District Council with the Fauldhouse Gas Company. We learn that this follows a report by the Fauldhouse Lighting Committee.

An Increase of 5·8% is reported by the Municipal Gas Department of Munich, Germany, the production of gas during 1934 amounting to 2,199,825,400 cu.ft. as compared with 2,079,452,400 cu.ft. in the preceding twelve months.

The Fourth Annual General Meeting of the London and Counties Coke Association will be held on Monday, Oct. 28, at the Hotel Metropole, London, at 3 p.m., and will be preceded by luncheon at 1 p.m. at the same Hotel.

Sir Francis Goodenough, C.B.E., was among the speakers at the Annual Banquet of the Institute of Industrial Administration held yesterday at Grosvenor House, Park Lane. Mr. Harold Macmillan, M.P., was in the chair.

Negotiations will Probably Re-Open with the Directors for the purchase of the Dysart Gas Company as a result of the recommendations made by a Committee appointed by the Kirkcaldy Town Council to consider the matter.

Applications are Invited by the North Shore Gas Company, Ltd., Sydney, N.S.W., for the position of Distribution Engineer at a salary of £750 per annum. Particulars will be found in the advertisement columns of this week's issue.

In An Address to the unemployed on Oct. 9, Mr. J. D. Ashworth, Engineer and Manager of the Blackburn Gas Department, dealt with the advances made by the Gas Industry during recent years with particular reference to the Blackburn undertaking.

Third World Power Conference.—It is announced that the Third World Power Conference will be held in Washington, U.S.A., from Sept. 7 to 12, 1936. British participation will be organized by the British National Committee of the World Power Conference, 36, Kingsway, London, W.C. 2.

The Engineers' Club, Manchester, celebrated its "Coming of Age" by a dinner at the Club on Monday, Oct. 14, 200 members and guests being present. The list of Past-Presidents includes the names of many engineers well-known in their different spheres, among them being Mr. F. J. West, C.B.E.

It was "Health Week" in Middleton, near Manchester, last week, and daily demonstrations of bread baking and general family catering were given in the Assembly Hall. A travelling kitchen was also utilized by demonstrators who gave cooking displays. Gas was, of course, the chief fuel used.

Tickets of Admittance to the Second Hinchley Memorial Lecture by Sir Harold Hartley, C.B.E., F.R.S., on "Our National Coal Resources," at the Institution of Civil Engineers, on Friday, Oct. 25 next, at 6.30 p.m., may be obtained from the Secretary of The Institution of Gas Engineers, 28, Grosvenor Gardens, S.W. 1.

"Aluminium Facts and Figures" is the title of a useful publication issued by the British Aluminium Company, Ltd., Adelaide House, King William Street, E.C. 4. The purpose of this book is to supply engineers with any information they may require on aluminium, and in view of the extensive use of this material in modern engineering practice few can afford to be without it.

A Reduction in the Price of Gas to industrial and commercial users to 7d. per therm, up to 500 therms per annum, and 6d. per therm over 500 is announced by the Stalybridge Gas-Works Committee. This applies to users of 125 therms per quarter. As soon as possible it is hoped to reduce the charges to domestic consumers.

In View of His Leaving the St. Austell Gas Company to take up an appointment at Dorchester, Mr. R. Morton will no longer be able to carry on the duties of President of the Cornish Gas Association; and Mr. H. H. Hoare, of Falmouth, will deputize for him during the remainder of his year of office. It has been agreed to reserve space for a Cornish gas exhibit at the 1936 Royal Cornwall Show to be held at St. Ives.

Gas Is To Be Largely Used in, and gas cooking apparatus is to be supplied to, the new restaurant which is to occupy the whole of the seventh floor of the new extensions now being made to the Manchester Town Hall. The restaurant is to be 120 ft. long and 40 ft. wide, and will accommodate nearly 500 people. It is proposed to serve over 2,000 people a day. Also under consideration is a tea-room for the use of the City Council.

The Purchase of the Undertaking of the Adlington Gas Company, Ltd., has been approved by the Chorley Town Council. The Council also approved application to the Ministry of Health for sanction to borrow the amounts necessary to defray the costs of purchase, extension of mains, &c. The Chairman of the Chorley Gas Committee, Alderman Gillett, said the average consumption of gas per consumer in Adlington was 10,985 cu.ft. and the price 5s. 5d. against 20,652 cu.ft. and 3s. 3d. at Chorley.

Appreciation was Expressed by the members of the Blackburn Town Council as well as the general public of the excellent stand arranged by the Corporation Gas Department, under the direction of Mr. J. D. Ashworth, at the Brighter Homes Exhibition, organized by the Blackburn Chamber of Trade in the King George's Hall. The Department took over the entire centre foyer, as well as the side rooms, one of which was used for lectures on cooking by gas. The visitors at the Exhibition approximated to 30,000.

Edinburgh's Reduced Gas Charges.—In the course of our reference in last week's "JOURNAL" to the proposed new scale of reduced gas charges at Edinburgh, we reported Councillor Walter Muter as having said that "the value of the present concession, taken in conjunction with last year's review of charges, made a total cost to the Gas Department of roughly £35,000 a year. That was a very dangerous concession to the gas consumer." This should, of course, have read ". . . very *generous* concession to the gas consumer."

An All-Gas Kitchen is one of the features of the second annual Homes and Fashions Exhibition which Miss Marie Tempest opened at the City Hall, Deansgate, Manchester, last week. The Gas Department are demonstrating replicas of gas appliances installed in H.M. the King's Jubilee House, and an adjoining stand is furnished with modern gas cooking, warming, laundering, lighting, and hot water appliances. Mr. Wilfred Francis, the well-known lightning cartoonist, entertains visitors from time to time and is attracting constant crowds to the stand.

"I Admire Your Courage" is the title of this year's Annual Report of St. Dunstan's for War-blinded Soldiers, Sailors, and Airmen. These words were used by H.R.H. the Prince of Wales when he was addressing a St. Dunstan's Jubilee Reunion at the Albert Hall. The report states that more than 60% of the 2,000 war-blinded men under its care still give "active service" to their country by doing useful work. Here indeed is a cause well deserving of support and all donations should be addressed to Capt. Sir Ian Fraser, C.B.E., M.P., St. Dunstan's Headquarters, Inner Circle, Regent's Park, N.W. 1.

Society of Chemical Industry.—An evening meeting of more than ordinary interest to many within the chemical and allied industries is to take place on Friday, Oct. 25, at Liverpool University (6 p.m.). The feature of the meeting is to be an Address by Mr. W. A. Damon, Chief Government Inspector of Alkali Factories, on "The Alkali Act and its Relation to the Chemical Industry." Readers of the "JOURNAL" wishing to take part—the Liverpool Section of the Society of Chemical Industry would be glad to welcome visitors—should communicate with Mr. J. S. Towers, c/o Messrs. J. W. Towers, Ltd., Widnes, Lancs., who is the local Hon. Secretary.

National Gas Council

Meeting of the Central Executive Board

A meeting of the Central Executive Board of the National Gas Council was held at 28, Grosvenor Gardens, S.W. 1, on Oct. 8, at 2.30 p.m. Pending the arrival of the Chairman (Sir DAVID MILNE-WATSON), the Chair was taken by Alderman J. H. LLOYD, J.P. (Vice-Chairman).

Mr. R. Bruce Anderson.—Before proceeding with the business of the meeting, the Secretary was instructed to write a letter to Mr. R. Bruce Anderson, who had now retired from the Board, thanking him for his past services and sending him the good wishes of the Board.

Joint Standing Finance Committee.—The recommendations of the Joint Standing Finance Committee at a meeting held on Sept. 10 were approved and adopted.

British Gas Federation.—

(*a*) *Annual Meeting and Second Annual Dinner, Nov. 4, 1935.*—The attention of members was called to the Notice sent them of the First Annual Meeting of the Federation to be held at Grosvenor House, Park Lane, W. 1, on Monday, Nov. 4, at 3 p.m.

Apart from formal business, a general discussion of matters of interest to the Gas Industry would be initiated. It was hoped that there would be a large attendance.

With regard to the Second Annual Dinner to be held the same day at 7 p.m., it was also hoped that as many Undertakings as possible would be represented. On the last occasion there had been nearly 700 representatives present (including many distinguished guests), but there was every reason to believe that on this occasion the attendance would far exceed that of last year, as the arrangements then were organized somewhat hurriedly.

(*b*) *Nomination of representatives to serve on the Council for the year commencing Jan. 1, 1936.*—The Board re-elected the following representatives to serve on the Council of the Federation for next year: Mr. A. W. Smith, Mr. T. P. Ridley, Mr. Wm. Cash, Mr. C. S. Shapley, and Sir David Milne-Watson.

S.B.G.I. Golf

The S.B.G.I. Golfing Circle's Autumn Meeting will be held at Richmond Golf Club, Sudbrook Park, on Monday, Nov. 4, and we are informed that the Circle will be delighted to welcome on that day members of The Institution of Gas Engineers attending the 7th Autumn Research Meeting.

All communications should be sent to the Hon. Secretary, W. R. Edgar, Blenheim Works, Lower Mall, London, W. 6.

The Institution of Heating and Ventilating Engineers

Programme for 1935-36 Session

The programme of the Institution of Heating and Ventilating Engineers for the 1935-36 session has just been published and we are indebted to the Council for the receipt of a copy.

It will be a busy year for the Institution, but the excellent selection of papers to be presented and visits to be attended promise to make it a memorable one. We in the Gas Industry have received very fair consideration at the hands of the Council in the arrangement of the programme. On Jan. 8, Mr. F. M. H. Taylor, Ph.D., B.Sc., who is already very well known to our readers, will deliver an address on "Automatic Boiler Controls" before a sessional meeting of the Institution. Then on Nov. 2, the members of the London and District Branch will visit the Manor House Flats, Putney, which were described in the "JOURNAL" for Aug. 21; on Jan. 18 a visit will be paid to the Nine Elms Lane Works of the Gas Light and Coke Company; and on Feb. 17, Mr. E. G. Brooks, of Messrs. Thomas Potterton (Heating Engineers), Ltd., will deliver a Paper on "Gas Water Heaters."

The Manchester and District Branch will visit the Stretford Gas-Works on Jan. 18. The Liverpool and District Branch will hear Mr. F. G. Bell, B.Sc., A.M.Inst.Gas E., on "Gas and the Heating Engineer" on Oct. 11. A visit to Messrs. Ideal Boilers and Radiators, Ltd., Hull, will be paid by the Birmingham and District Branch on Feb. 24. In addition to those mentioned above there are a number of papers on the subject of heating and ventilating in general and other visits which will be of interest to the gas engineer.

Forthcoming Engagements

Oct.

17.—B.C.G.A.—Midlands District Conference at Wolverhampton.

17.—EASTERN COUNTIES ASSOCIATION.—Autumn Meeting at the Stanton Ironworks Company, near Nottingham.

17.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—Meeting at 28, Grosvenor Gardens, S.W. 1.

18.—MANCHESTER DISTRICT ASSOCIATION.—Meeting at Midland Hotel, Manchester, at 2.30 p.m.

18.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Presidential Address of J. M. Webber.

19.—SCOTTISH JUNIOR ASSOCIATION.—Joint Visit to Thomas Glover & Co., Ltd., Edmonton.

22.—I.G.E.—Gasholder Committee, 2.30 p.m.

25.—GAS COMPANIES' PROTECTION ASSOCIATION.—Committee Meeting, 2.30 p.m.

26.—WESTERN JUNIOR ASSOCIATION.—Meeting at Bristol. Paper by Dr. F. J. Dent, I.G.E. Research Chemist.

26.—YORKSHIRE JUNIOR ASSOCIATION.—Annual Meeting at Leeds. Address by Mr. H. Burton, of Shipley.

28.—LONDON AND COUNTIES COKE ASSOCIATION.—Fourth Annual General Meeting, Hotel Metropole, London, 3 p.m.

29.—B.C.G.A.—Eastern District Conference at Peterborough.

Nov.

4.—B.G.F.—1st Annual General Meeting, Grosvenor House, Park Lane, London, W. 1, 3 p.m.; 2nd Annual Dinner, Grosvenor House, Park Lane, London, W. 1, 7 p.m.

5.—I.G.E.—Council, 9.30 a.m.; Council, 4.30 p.m.

5 and 6.—I.G.E.—7th Autumn Research Meeting at The Institution of Mechanical Engineers, Storey's Gate, St. James' Park, S.W. 1.

6.—MANCHESTER AND DISTRICT JUNIOR ASSOCIATION.—Visit to Prescot. Paper by Mr. F. N. Booth and Mr. J. Fletcher.

7.—S.B.G.I.—Council Meeting, 11 a.m., followed by the Autumn General Meeting.

7.—MIDLAND JUNIOR ASSOCIATION.—Meeting. Paper by Mr. R. G. Marsh.

12.—I.G.E.—Gas Education Executive Committee, 4 p.m.

14.—MIDLAND ASSOCIATION.—Autumn General Meeting, Grand Hotel, Birmingham.

14.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—Meeting at 28, Grosvenor Gardens, S.W. 1.

15.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Annual Dinner.

16.—YORKSHIRE JUNIOR ASSOCIATION.—Meeting at Shipley. Presidential Address of Mr. J. W. Carlton.

16.—WESTERN JUNIOR ASSOCIATION.—Meeting at Exeter. Paper by Dr. C. M. Cawley, of the Fuel Research Department.

19.—I.G.E.—Session at the 8th Public Works, Roads and Transport Congress and Exhibition, Royal Agricultural Hall, London, N. 1, 3 p.m.

22.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Meeting. Paper by Mr. W. Grogono, of Croydon.

29.—I.G.E.—Liquor Effluents and Ammonia Committee, 11.15 a.m.; Joint Research Committee, 2.30 p.m.

Dec.

3.—I.G.E.—Research Executive Committee, 2.30 p.m.

4.—MANCHESTER AND DISTRICT JUNIOR ASSOCIATION.—Visit to Birkenhead. Paper by Mr. A. J. Walker.

5.—MIDLAND JUNIOR ASSOCIATION.—Annual Dinner.

13.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Paper by Mr. L. Friedman, of Ascot Gas Water Heaters, Ltd.

14.—SCOTTISH WESTERN JUNIOR ASSOCIATION.—Meeting and Address by Mr. W. D. Rowe, of the B.C.G.A.

14.—WESTERN JUNIOR ASSOCIATION.—Meeting at Torquay. Paper by Mr. J. W. Denton, of Torquay.

21.—SCOTTISH WESTERN JUNIOR ASSOCIATION.—Annual Social.

Glasgow Gas Meter Testing Department

Report on the Year's Working

The report on the work of the Glasgow Gas Meter Testing Department for the year ended May 31, 1935, states that the total number of meters tested during the year was 33,452, and the amount of fees collected was £2,133. These figures are a decrease on those of 1934. Of the total number of meters tested 11,805 were new meters, 21,234 were repaired meters, and 413 were submitted on behalf of gas consumers for certification as to correctness.

Four 10 cu.ft. standard test holders, which were due for the decennial re-verification, had to be thoroughly overhauled by the makers and brought up to date to meet the existing requirements of the Board of Trade before they could be re-verified and stamped by the Officials from the Standards Department, Board of Trade.

An Attractive Radiator Display

This pleasing gas radiator display has been produced by the Parkinson Stove Company, and shows their "Ubic" heater in an attractive setting.

Oxidation and Scaling of Heated Solid Metals*

The Metallurgical Research Board of the Department of Scientific and Industrial Research has been engaged for some time in bringing together as comprehensive a collection as possible of subjects which call for investigation and are of special importance at this time to the metallurgical industries of this country. Among subjects to which special attention has been given is that of the oxidation and scaling of heated solid metals.

As a prelude to further research the members of a conference of investigators called together by the Department have prepared a critical survey of existing knowledge of the subject which was published last week.

Oxidation and scaling is a phenomenon of very great importance in the treatment, fabrication, and use of metals. The effective life of metal used under conditions that produce progressive oxidation is bound to be comparatively short; and though the development of heat-resisting alloys has effected a considerable improvement in this respect, there is still a great deal that remains to be done. Oxidation during treatment gives rise to a variety of troubles, among them being loss of metal, decarburization, destruction of furnace linings, defects in drop forgings, unsatisfactory surfaces, and so on.

The six sections of the review, each of which is contributed by a well-known authority, deal with the theoretical aspects of oxidation, the constitution and formation of scales on ferrous alloys, the quantitative aspects of the oxidation and scaling of iron and steel at elevated temperatures, the oxidation of non-ferrous metals, and the industrial and practical aspects of the subject. The first four sections deal with the mechanism and the rate of oxidation in different temperatures and atmospheres and the nature and properties of oxide layers formed. The last two sections are concerned with the practical aspects of oxidation and scaling and the methods at present available for its control. The review also calls attention to certain problems upon which further research is necessary and is designed to assist both present and future investigators.

* Published by H.M. Stationery Office; 2s. 6d. net.

Manchester and District Junior Gas Association

Preston Meeting and Election of Officers

The Annual General Meeting of the Manchester and District Junior Gas Association was held at Preston on Oct. 5, 1935, when the Directors of the Preston Gas Company invited the members to visit their Lostock Hall Works.

After tea, the retiring President, Mr. James Carr, invested Mr. A. K. Collinge as President. Mr. Carr stated that he had been very proud to have been the President of the Manchester Juniors during the past year, and he hoped that Mr. Collinge would have a very successful year of office. Mr. Collinge said the honour was one that he appreciated very much, particularly when he read through the names of the 34 members who had preceded him in the office of President. It was through their help and guidance that the Association had been built up, and he would endeavour to maintain the standard that had been set by them.

In proposing a vote of thanks to the retiring President, Mr. Collinge referred to the fact that Mr. Carr laboured under the handicap of bearing a name which was honoured throughout the Gas Industry. He was handicapped because the world expected too much and often more than it was possible to give. Mr. Carr had carried out his duties in the best possible manner. He had not only pointed the way to make cheap gas, but how to sell it, and during his year of office he had imparted some of his ideals. Mr. Carr suitably responded and paid tribute to his officers and Council.

Mr. N. Partington (Oldham) proposed a vote of thanks to the Directors of the Preston Gas Company for their kind invitation to the Works and also for their hospitality.

Mr. S. Tagg (Preston) in reply said that he and his co-Directors were very appreciative of the honour conferred on Mr. Collinge, and they believed that the choice was a wise one. The Association would continue to serve its useful purpose to the Industry under his guidance; there was no need for him to stress the advantages and the benefits of the Junior Associations. The President of The Institution of Gas Engineers, Col. W. M. Carr, had stated that it was his intention during his year of office to direct the attention of the Senior Institution rather more in the direction of the application and utilization of gas. But if the Senior Institution, by perforce of other business, had to devote less time to engineering and other problems, then it devolves upon the Junior Associations to continue to exchange views and also to improve the efficiency of those processes for which they are directly responsible. Mr. Tagg went on to say that during the week he had referred to a Paper which he had the pleasure of reading before the Association some 33 years ago, on "Efficiency in Gas Manufacture." At that time, while some Undertakings were feeling the effects of electrical competition, it was not sufficiently advanced to injure the position which the Gas Industry then enjoyed. Such a state of affairs was now passed. There is now a very strong incentive to improve our manufacturing methods so as to enable the sales staff to sell a reliable commodity at the lowest possible price. He would like to stress that routine work can be relieved by intelligent direction, but it is also reflected in the balance sheet and prosperity of the Industry.

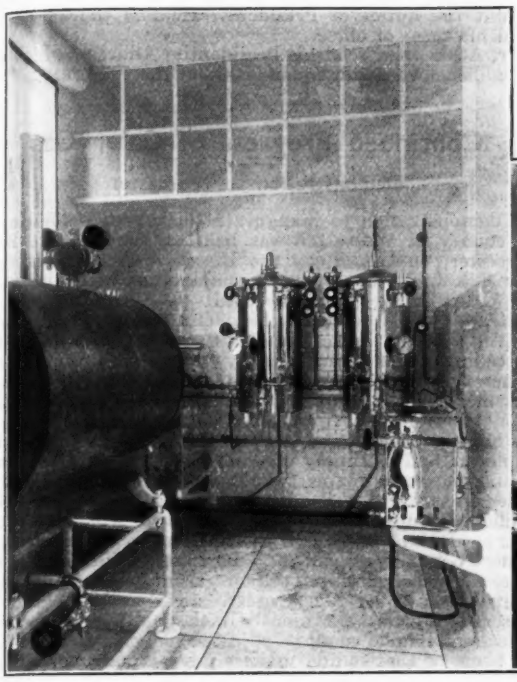
The following officers were then elected for the ensuing year:

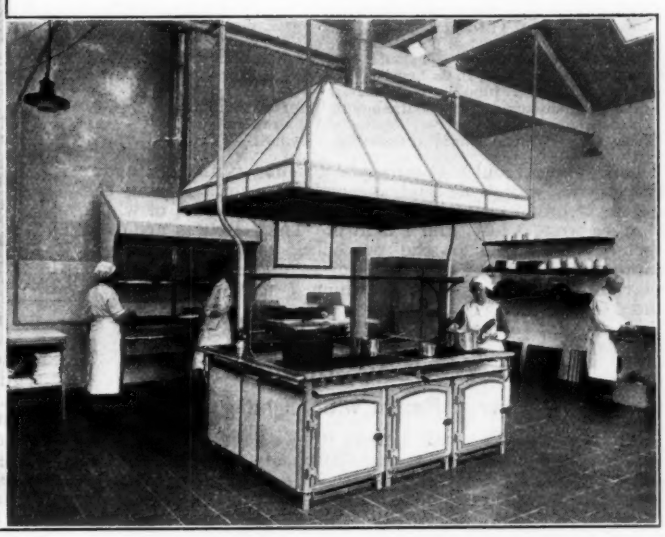
President.—A. K. Collinge.
Senior Vice-President.—J. Carr.
Junior Vice-President.—T. Caldwell.
Hon. Secretary.—J. Alsop.
Assist. Hon. Secretary.—F. Johnston.
Hon. Treasurer.—E. Kenyon.
Hon. Auditor.—J. H. Cadman.

The Presidential Address was then given by Mr. A. K. Collinge (see page 201).

Mr. F. A. Rhead (Wallasey) proposed a vote of thanks to Mr. A. K. Collinge for his Presidential Address.

Modern Gas Equipment for Hospital Kitchens





Up-to-date gas apparatus has recently been installed by the Tunbridge Wells Gas Company in the new Queen Victoria Hospital, Tonbridge, and also in the Pembury Hospital's new kitchen extension.

The former installation includes cooker combination, "Rotopan" steamer, gas-operated refrigerator, and sterilizing equipment—the last-named being illustrated in the left-hand photograph above. This hospital is central heated by a coke boiler, while all the emergency lighting is by gas.

The photograph on the right shows the new kitchen extension at the Pembury Hospital, where the equipment comprises a Davis two-pan fish fryer and a six-oven range. This supplants a coal range on which all the cooking was previously carried out. Gas is now used very extensively at the Pembury Hospital, and the new kitchen reflects the great confidence which the Hospital authorities have placed in gas.

The work at the Tonbridge Hospital was carried out under the direction of Mr. J. W. Little, F.R.I.B.A., and at the Pembury Hospital under Mr. W. E. Fretwell, Consulting Engineer to the Kent County Council.

Growth of the Synthetic Paint and Varnish Industry

New Offices for Nobel Chemical Finishes, Ltd.

The growth of the business of Nobel Chemical Finishes, Ltd., since their foundation in 1926 has indeed been phenomenal. Formed originally as a subsidiary Company to the Nobel Group to carry out the manufacture of nitro-cellulose finishes it has now returned to occupy the premises which formerly provided for the parent Company which later amalgamated with other large industrial concerns to form Imperial Chemical Industries, Ltd.

An informal "house-warming" on Wednesday, Oct. 9, provided us with an opportunity of inspecting the truly magnificent premises at Nobel House, Buckingham Gate, S.W. 1, where the staff have settled down with startling rapidity, and office routine is now cheerfully followed with quiet efficiency. For some time past the need for increased accommodation has been felt at Slough, where the offices and works were situated, and that was the prime reason why the offices were moved to the spacious Nobel House. Also a new factory is in course of construction at Stowmarket, Suffolk, which forms part of an extensive programme for increasing the manufacturing capacity of the Company. These developments taking place within nine years of the formation of the Company are striking proof of the need which Nobel Chemical Finishes has filled, and an even greater testimony to the manner in which it has been filled.

Large rooms, many of which are panelled in teak, modern office equipment, and every convenience for the comfort of the staff characterizes the new premises. The paintwork, which is carried out with the Company's decorative products, does credit to the architecture of the building, and is incidentally an excellent example of what can be done with Nobel finishes. A praiseworthy effort has been made to effect what might be termed "departmentalism" among the sales staff. This involves entrusting certain "lines" to responsible individuals, and has the advantage of rendering the tracing of any particular order extremely simple. Ample room for further expansion is provided at Buckingham Gate, and, if the rate of growth in the past is maintained in the future, this is sure to be rapidly filled.

We are informed by the Company that to meet this rapidly increasing demand, productive capacity is being increased at Slough, Stowmarket, Birmingham, and Derby. New buildings are being erected and new plant installed at all existing factories, and the new factory at Stowmarket will go into production as soon as building is completed.

Gas Progress in Inverkeithing

Town Council Renew Agreement for Ten Years

Inverkeithing Town Council has renewed its agreement with Inverkeithing Gas Company on the following terms:

(1) The Company to reduce the price of gas by 4d. per 1,000 cu.ft.

(2) The rate for cooking and heating, which is 5d. below that for lighting, to be applicable in all cases where gas is not used for lighting as well as cooking and heating.

(3) When gas is used for both lighting and cooking or heating in reasonable quantities the Board will make an adjustment in the price, charging a proportion at the cooking rate and a proportion at the lighting rate, which they consider will be fair to the consumer and to the Company.

(4) The renewed agreement to be operative till May 15, 1945.

Athletic and Social

Bournemouth Activities.

The *Co-Partnership Magazine* of the Bournemouth Gas and Water Company deals fully with the Annual Sports held at Bourne Valley Ground. The Chairman of the Company, Mr. William Cash, presided over the gathering, and the following were among the prizewinners:

100 yards—1, R. T. Holloway; 2, E. Dommett; 3, J. B. Neill.
200 yards—1, C. Hewish; 2, R. T. Holloway; 3, J. H. Watson.
Sack race—1, E. Yeoman; 2, J. L. Ellis.
Obstacle race—1, T. Damen; 2, J. L. Ellis; 3, A. Jupp.
Mile—1, J. N. Watson; 2, J. E. Durston; 3, F. Gould.
Three-legged—1, Bungay and Gould; 2, Smith and Damen.
Putting the weight—1, P. G. Lovell (30 ft.); 2, J E. Durston; 3, S. Darby.
Pillow fight—1, A. Jupp; 2, F. H. Davis.
Inter-company tug-of-war—Bournemouth beat Southampton.
Inter-department tug-of-war—1, Mains beat Bourne Valley "B."
Relay race—1, Head Office; 2, Poole and Pitwines.

The Bournemouth Company's Cricket Club has again had a very enjoyable and successful season. During the season 27 games were played by the First Eleven, of which 17 were won, 6 lost, and 4 drawn. These figures are even better than those in the preceding season when eight games were lost out of a total of 24 played. The Second Eleven played 18 games, of which 7 were won, 10 lost, and 1 drawn.

Good Work at Southminster

Council Pleased with Lighting

Our readers will recall a news item in the "JOURNAL" for July 10 concerning the acquisition of the Southminster Gas Company by Mr. R. V. E. de B. Crawshay. Since that date splendid work has been carried out under the direction of the new Managing Owner, and if one day electricity should find its way to the district, it will have to fight an uphill campaign to secure any consumers.

The Parish Council have renewed the Public Lighting Contract giving Mr. Crawshay a practically free hand to improve the illumination. This he has achieved by erecting in the High Street seven Parkinson "U" fitting three burner lamps and one of their "Rotherham" five burner ones. Deserved recognition was not long forthcoming from the Parish Council and a letter from the Clerk runs: "I am instructed by the Parish Council to convey to you the appreciation of the Members for the great improvement you have effected in the Public Lighting of the Village. The Council consider that there are few villages which are better lit than Southminster, and your up-to-date Lanterns are greatly admired. The Council wish me to thank you most heartily."

But Mr. Crawshay contemplates further improvements. He has already renovated the showrooms, laid a new 4-in. Stanton spun main from the Works to the centre of the village, another main has been extended in two directions, and several larger services have been put in to give consumers a proper supply. We hope to give our readers the full story of Mr. Crawshay's good work in the near future.

Midland Junior Gas Association

Opening Meeting

A Meeting of the Midland Junior Gas Association was held at the Gas Department, Birmingham, on Thursday, Oct. 3—the retiring President, Mr. J. H. WAINWRIGHT, being in the Chair.

On behalf of the Association, the Chairman congratulated those Members who had been successful in passing the 1935 Examinations of The Institution of Gas Engineers.

Mr. Wainwright said he now had the pleasant duty of handing over the reins of office to the new President, Mr. F. L. Atkin, of the Industrial Research Section of the Birmingham Gas Department. He said he had occupied the Chair with a great deal of personal pleasure and had received the loyal support of members during his term of office, and he sincerely hoped that Mr. Atkin's year of office would be as happy as his had been.

Mr. Wainwright then invested Mr. Atkin with the Presidential Badge of Office.

Upon occupying the Chair, Mr. ATKIN proposed a vote of thanks to the retiring President for the excellent way he had officiated during the past session. He had carried out the duties of President in his usual thorough manner and the Association had enjoyed a most successful session.

Mr. S. K. HAWTHORN (Birmingham), in seconding the vote, said he heartily agreed with Mr. Atkin's remarks. No one would question Mr. Wainwright's enthusiasm, and the Association had undoubtedly benefited by his enterprise. The programme of visits last year was the most ambitious attempted and was due to Mr. Wainwright's initiative.

Mr. WAINWRIGHT, in reply, assured the members that he had been very happy to have had the honour of carrying out the duties of President. He had thoroughly enjoyed his term of office.

Mr. Atkin then read his Presidential Address, which will be published in a subsequent issue of the "JOURNAL."

Continued Progress of Calor Gas

Demonstration at Worcester

A demonstration to inaugurate the use of Calor Gas in the county of Worcester was held at the Masonic Hall, Worcester, on Oct. 8, by the Directors of the Worcester New Gas Light Company in conjunction with the Calor Gas (Distributing) Company, Ltd.

The Mayor of Worcester, Mr. John Stallard, who is also Chairman of the Worcester Gas Company, in opening the proceedings, stated that already there were in rural parts of the county a few users of Calor Gas supplied in the usual containers by the Worcester Gas Company, and a number of enquiries had been received. This demonstration, it was hoped, would make clear to those interested that the simple method of supply of Calor Gas, for users who were beyond the town mains, would enable them to enjoy at moderate cost all the advantages and convenience of a regular gas supply. Calor Gas was in no sense a new discovery. It had been used in America for some years, in France, Germany, Spain, and Portugal, while in Holland, where its use had developed of recent years only, there were already some 50,000 users. In France the number of users had grown enormously in the last few years. Any modern appliances could be adjusted to consume Calor Gas, and some of the leading makers were producing standard appliances designed for its efficient use.

It could be delivered anywhere in Calor Gas containers 12 by 16 in., and the method of installation was for a new consumer to purchase two containers, guaranteed as to use for five years, and one Calor Gas pressure regulator. The supply in one container was enough to last an average family of three persons from 6 to 10 weeks according to the rate of use. The disadvantages of oil consumption, filling of reservoirs, priming of wicks, and pumping of pressure were avoided, and a clean and efficient service provided.

Mr. H. Pickering, of the Calor Gas (Distributing) Company, explained that the gas was a hydrocarbon-butane mixture liquid under a compression of 1½ atmospheres—or approximately 23 lb. per sq.in. A charged container weighed 49 lb. and held 28·6 lb. of liquid butane. Calor Gas was non-toxic. The vapour pressure of butane at 122° F. was 78·6 lb. per sq.in. The pressure regulator for any part of the equipment was adjusted to give a pressure at the outlet to the burner of 12 in. water column, and no adjustable orifice was necessary on any appliance.

The usual range of appliances was demonstrated, including lighting burners, cookers, fires, water heaters, gas kettles, boiling rings, &c. One light equipped with a universal gas mantle would, it was claimed, burn continuously for 325 hours from one container. The method of exchange from an exhausted container to a newly charged one called for the adjustment of one union nut only.

Several gas engineers present were anxious to obtain exact details of cost, as also was a hotel proprietor from a local country area and, in reply to these, Mr. G. P. Mitchell, Engineer and General Manager of the Worcester New Gas Light Company, explained that the present cost would be approximately double that of Worcester town gas, the cost of which was low. Without precise details of the number and class of points of consumption in a given case it was difficult to give exact information of cost over a given period, but shortly some exact details as to this would be available. Apparatus for use with Calor Gas would be available for rental or hire-purchase.

Mr. Galloway, the first user of Calor Gas in Worcester County, stated that he had found it efficient and satisfactory in every way, but his experience was at present confined to its use for lighting purposes only.

Mr. A. Roberts, Engineer and General Manager, Hereford Corporation Gas Department, was of opinion that the future of Calor Gas in rural areas, to which its use would be confined, lay largely in its cost. Its advantages to those beyond the mains were unquestionable, and the simplicity of transfer to a new container eliminated any element of danger.

Alderman F. J. Ballard, Chairman of the Hereford County Council, and also Chairman of the Colwall Gas Company, proposed a vote of thanks to the Mayor of Worcester, and added that the experience of the use of Calor Gas abroad would be regarded as a reliable index to

its efficiency and cost here. He expected to see its use develop in outlying country areas.

The guests showed considerable interest in the working models displayed, and were entertained at tea by the Directors of the Worcester New Gas Light Company.

A Hundred Years of Gas at Weymouth

Quaint Newspaper Report of the Inauguration

When gas arrived at Weymouth a hundred years ago it received a tumultuous welcome which was described by the *Dorset County Chronicle* of Oct. 8, 1935, in a manner that makes present-day journalism look pale and wan by comparison.

"Thursday was a day, or rather a night, to be celebrated in our annals—an epoch in our history. Darkness is no longer visible: *Gas*, brilliant as the noon-day sun, dispels the mist and gloom of ages. One of our senators has at length really enlightened us;—as Gas-purveyor to His Majesty's lieges in Weymouth, and leaves us on that head nothing to desire. The street lamps are large and elegant, and the supply of gas is ample and of a superior quality. No longer can Corporation reformers say they are kept in the dark—all now is exposed—holes and corners are no longer sacred—Mr. Burdon has done it effectually:

"'That which *was* dark *he has* illumined . . .' Every effort was made to give proper effect to the lighting-up: the town brass band commenced the business by playing 'See the conquering *gas-man* comes.' *Luna* shrunk abashed—'She wept behind a cloud,' and tears fell copiously;—heavy wet became the order of the evening,—to be sure it varied in quality—at the gas works the *spirited* proprietor mixed it—on the Esplanade it was purity itself—the most zealous member of our Temperance Society could not have quarrelled with it: it was a struggle of the elements; but fire triumphed. Any man now can see the errors of our ways; a week since, and at nine o'clock all was gloom and quiet; now all is light, bustle, and excitement.

"No longer can the footman of No. 13 flirt upon the area steps with the housemaid of No. 14—'Missus will see us, the gas-light is so awkward.'"

This was no "flash-in-the-pan" either for the lasting popularity of gas at Weymouth is reflected in the continued progress made by the Consumers' Gas Company since those early days.

Sutton's Volumetric Analysis—Twelfth Edition*

"The experiments, made in connection with the various processes for the purpose of testing their accuracy, have extended over several years, and amounted in number to many thousands; the book is, therefore, based on the right foundation, granting only (and this is of the utmost importance) that the foundation be rightly laid."

Thus the author in the preface to the first edition of "Sutton's Systematic Handbook of Volumetric Analysis," published over seventy-two years ago, with reference to the extensive research that was undertaken in the compilation of what has since proved to be an indispensable work in the analytical chemist's library. The task of revising such a book as "Sutton," with a tradition of seventy years behind it, is not to be undertaken without a feeling of diffidence, but, with due deference to the excellent foundation "well and truly laid" by Mr. Francis Sutton, the continued usefulness of the work is largely due to the patient revision undertaken from time to time by chemists of the calibre of Mr. A. D. Mitchell, D.Sc., F.I.C., well known as Scientific Assistant to the University of London, and Assistant Editor of our contemporary the *Journal of the Chemical Society*. With commendable zeal he has spared himself no pains to ensure that nothing but practical and accurate methods should find space in what might otherwise prove a somewhat unwieldy volume. Obsolete methods, the deletion or curtailment of which was necessary and long overdue, have made way for the inclusion of new subjects which are essential in view of their greatly increased importance. Among these are molybdenum and tungsten. The "pruning," however, has been carried out with judicious care and what might be termed standard methods are, of course, retained.

The handbook is intended only for those who have received some training in chemistry and to form no royal road to chemical analysis. But a serious attempt has been made to render straightforward descriptions of the processes employed which greatly enhances the value of this work as a book of reference. Great cause for satisfaction on the part of the gas-works chemist is to be found in the section on Gas Analysis. This section in the past had been neglected and did not receive the attention that it rightly merits, but in the present edition it has been completely revised by Dr. J. S. G. Thomas, D.Sc., A.R.C.Sc., A.I.C., joint author with Mr. H. Hollings, M.Sc., A.I.C., of the Gas Light and Coke Company, of the new article in the 1924 edition. Over one hundred pages, roughly one-sixth of the total, deal with such aspects as sampling, circulation devices, preparation of absorption and eudiometric tubes, correction of volume, methods of analysis, direct and indirect determination, fractional combustion, forms of apparatus, micro-gas analysis, and the nitrometer.

The diagrams, over a hundred in number, which supplement the text call for special mention on account of the adroitness with which they illustrate the method or apparatus employed. Mr. Mitchell has every reason to congratulate himself upon undertaking an extremely difficult and unenviable task, and acquitting himself in a manner fully worthy of the high traditions of a work which has stood the acid test of nearly three-quarters of a century's use.

*J. & A. Churchill, 40, Gloucester Place, Portman Square, W. 1. Pp. 631 + XIV.; 35s.

Meter Making on Tyneside

Messrs. Thomas Glover & Co., Ltd., have written calling our attention to a heading on page 698 of our issue of Sept. 25—"New Industry on Tyneside"—and to the fact that they, together with their allied firm—Messrs. R. & A. Main, Ltd.—opened a factory in the City of Newcastle more than fourteen years ago. By 1931 the continuous growth of their business compelled them to move to their present freehold premises at 100, Durham Road, Low Fell, Gateshead, where they laid down a thoroughly up-to-date plant and a Lorry Depot to deal with their growing business in Tyneside and the Northern Counties.

Glad Tidings from "Down Under"

Increase of 18% in the Sales of Gas

Excellent reading is provided by the report of the Directors of the Gas Supply Company, Ltd., of Melbourne, which was presented at the ninth annual general meeting held on Sept. 30 last.

During the year ended June 30, 1935, the volume of gas sold was 18% above last year or 61% above 3 years ago. During this period of 3 years, the average prices charged for gas have been reduced by 35%. The number of new services connected for the year was 519 (compared with 435 last year). The number of new appliances connected was 2,157 (compared with 2,079 last year). Operations at the two largest Works—Cairns and Mackay—were hampered during the year; at Cairns owing to the erection of a new gasholder and considerable alterations to other plant; at Mackay owing to the Company's contract for the installation of a complete gas-operated electricity generating plant of 600 horse power at the Harbour Board, and consequent additions to the Gas-Works plant. All this work is now completed.

The accounts for the year show a profit of £14,994, amount brought forward from last accounts, £291, making a total of £15,286, which, less interim dividend, at the rate of 6% per annum, paid March 28, 1935, £6,626, leaves a balance of £8,660. The Directors recommended this sum be applied as follows: Dividend at the rate of 6% per annum for the half-year ended June 30, 1935 (making 6% for the year), £6,626, transfer to provision for income-tax, £1,700, and carry forward £334.

Scottish Eastern Juniors

Opening Meeting at Dunfermline

The Opening Meeting of the 32nd Session took place in the City Chambers, Dunfermline, on Saturday, Oct. 5, 1935, when the retiring President, Mr. Sydney Smith, late of Dunfermline and now of Bristol, introduced the new President, Mr. A. J. Doran, of Edinburgh.

Mr. Smith expressed his regret that he had not been able to fulfil his duties of President to the extent that he should have liked owing to his appointment to Bristol during the past session. However, he was happy to know that under Mr. Doran's guidance the Association had completed a very successful session. He also extended his thanks to the Council and members for their support to himself and latterly to Mr. Doran. In these circumstances he felt that Mr. Doran required no formal introduction, as his work for the Association as acting-President during the previous session and as Librarian and Education Representative had assured them of an enthusiastic lead and wise guidance.

Mr. Doran in accepting the chair of office thanked Mr. Smith for his kind remarks. He then presented Mr. Smith with a gold wrist watch as a memento of his year of office and with it the best wishes of the members.

Mr. Smith in reply said he much appreciated the kindness shown to him and thanked the members for the handsome memento.

Illuminating Engineering Society

New President Calls on Composite Traders to Co-operate

Speaking at the Opening Meeting of the 1935-36 session of the Illuminating Engineering Society, the new President, Mr. A. W. Beuttell, in his Presidential Address said that the lighting industry had reached an interesting stage of its career. It had reached maturity and had, so to speak, gone into business for itself, undertaking full responsibility in its own field. He felt that no industry, with the exception possibly of aviation, has so much cause for optimism and confidence in its future. Since the human being is designed to look to natural light as his normal supply, and since the present deficiency between natural and artificial light is very great, it follows that there must and will be a continuous demand for more artificial light until this deficiency is made good.

Lighting becomes each day a matter of higher and more specialized knowledge. Its technique grows accumulatively beyond the command and even the comprehension of some who, though engaged in other composite trades and professions, have to undertake it. The remedy must be for them to employ specialists, but, because lighting is so intimately involved in their problems, they cannot wholly give up the study of it.

It was announced that the Leon Gaster Memorial Premium has been awarded to Mr. H. N. Green for his Paper on "Recent Developments in Airway and Aerodrome Lighting." A new award, created for the encouragement of younger members, was also announced. This is the Silver Jubilee Commemoration (1934) Award, open to members or affiliated students under 26 years of age, which has been awarded to Mr. Ralph Hopkinson for a contribution entitled "The Photographic Representation of Street Lighting Installations."

The Report of the Technical Committee to the Society states that the original prismatic glass dish refractors developed for use with gas lamps have been extended; three sizes, 6, 8, and 10 in. in diameter and in both axial (190°) and non-axial (160°) types, are now available. The intermediate size is also produced in "slotted" form for use in the square type lantern with burner and by-pass fed from underneath. Researches conducted by the Joint Lighting Committee of The Institution of Gas Engineers have indicated that the depreciation of gas street-lamps under service conditions need not exceed 30%.

A new form of lamp has been designed by the Technical staff of the South Metropolitan Gas Company, and was described in a Paper read at the Annual Conference of the Association of Public Lighting Engineers by Mr. D. Chandler and Mr. A. J. Prestage. The demand for floodlighting during the Jubilee celebrations resulted in several new designs, among the most notable being a unit giving an almost perpendicular beam. Special units have also been developed for the illumination of swimming pools and for schemes of architectural lighting. Gas table and floor standards for use with gas plug connectors have also been designed.

There are indications of a revival of interest in gas lighting in the United States, where a lamp has been designed using low-pressure gas with a small electric motor embodied in it which propels air and gas through the burner so as to produce a high-pressure effect.

Among the speakers at the series of demonstrations held subsequently were: Mr. A. J. Prestage, South Metropolitan Gas Company, on high and low pressure "Supervia" gas lamps; Mr. W. J. G. Davey, Messrs. W. Parkinson & Co., on new types of gas lamps; and Mr. A. R. McGibbon, Messrs. William Sugg & Co., on gas lamps for street lighting.

"Plumbing and Domestic Engineering"

Publication of Part I.

To be completed in thirty weekly parts, "Plumbing and Domestic Engineering," published by George Newnes, Ltd., 8-11, Southampton Street, Strand, W.C. 2, price one shilling each, promises to be an excellent investment for the gas fitter as well as the plumber and electrician.

"Domestic Engineering" is an all-embracing term, and taken in its broadest sense includes all the services which are installed in modern houses and large buildings, including hot water supply, drainage systems, central heating by coal, oil, or gas-fired boilers, lighting and heating by gas and electricity, and gas and electrically-operated refrigerators. In Part I., Mr. R. N. Le Fevre, of the Gas Light and Coke Company, deals with "Fitting Gas Refrigerators." The articles contributed are of a very high standard and are supplemented by clear diagrams and many illustrations. A useful chart showing modern systems of hot water supply and central heating is given free with the first issue.

Newcastle's "Early Birds"

Queues at Gas Sale

At the 14th annual sale of the Newcastle-upon-Tyne and Gateshead Gas Company, where records have been broken each year, the *Newcastle Journal* states that queues began to gather at 7 a.m. on Oct. 5 to seize the special opportunities offered to the public in the form of bargains, concessions, and free hire offers of modern labour-saving gas appliances. The sale extends for two weeks at all showrooms of the Company.

The Company were the first public utility body in this country to introduce a "sale" as one of their policies in the development of the sale of gas.

As a fairly reliable index of the improved conditions in the district, it is of interest to note that the Company are selling more gas than ever before. Consumers benefit by recent substantial reductions in price of gas to the extent of £27,000 per annum.

Coke Heating for the Market Gardener

Useful New Publications

An endeavour has been made recently in these columns to stimulate the interest of the Industry in the possibilities of a greater extension of the coke market into the sphere of the nurseryman and market gardener, both for soil warming and glasshouse heating, in the belief that there exists here a very promising load for our chief by-product, provided an effort is made to secure it.

The good services which the London and Counties Coke Association are doing in this respect are well known, so that their latest step in the publication of two comprehensive brochures on the subject will be welcomed as further proof, if such be necessary, of their continued activities in what may be regarded, in some respects, as pioneer work.

"Soil warming for bigger, better, and earlier crops" concisely sums up the contents of one of the brochures, which will make a ready appeal to growers. The information contained in it concerning the experimental installations which have been in successful operation for some time past enlarges upon and completes the brief details which have been given in the "JOURNAL." The remarkable difference between crops grown in warmed and unwarmed soil is clearly shown in a number of excellent comparative photographs. The other brochure deals with the art of successful boiler firing for the heating of glasshouses. Here, again, valuable information is given on the subject of saving fuel costs by the use of gas coke, while details are included of the gravity-feed boiler for this purpose and of its obvious advantages.

Both publications are very timely, and should do much to assist the Industry's coke sales in a direction not hitherto seriously explored.

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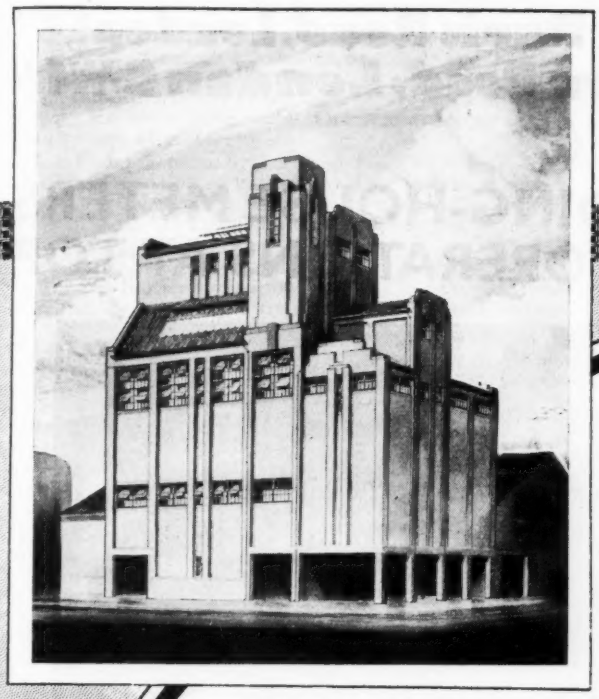

Design Drawing for the new Installation at Loughborough

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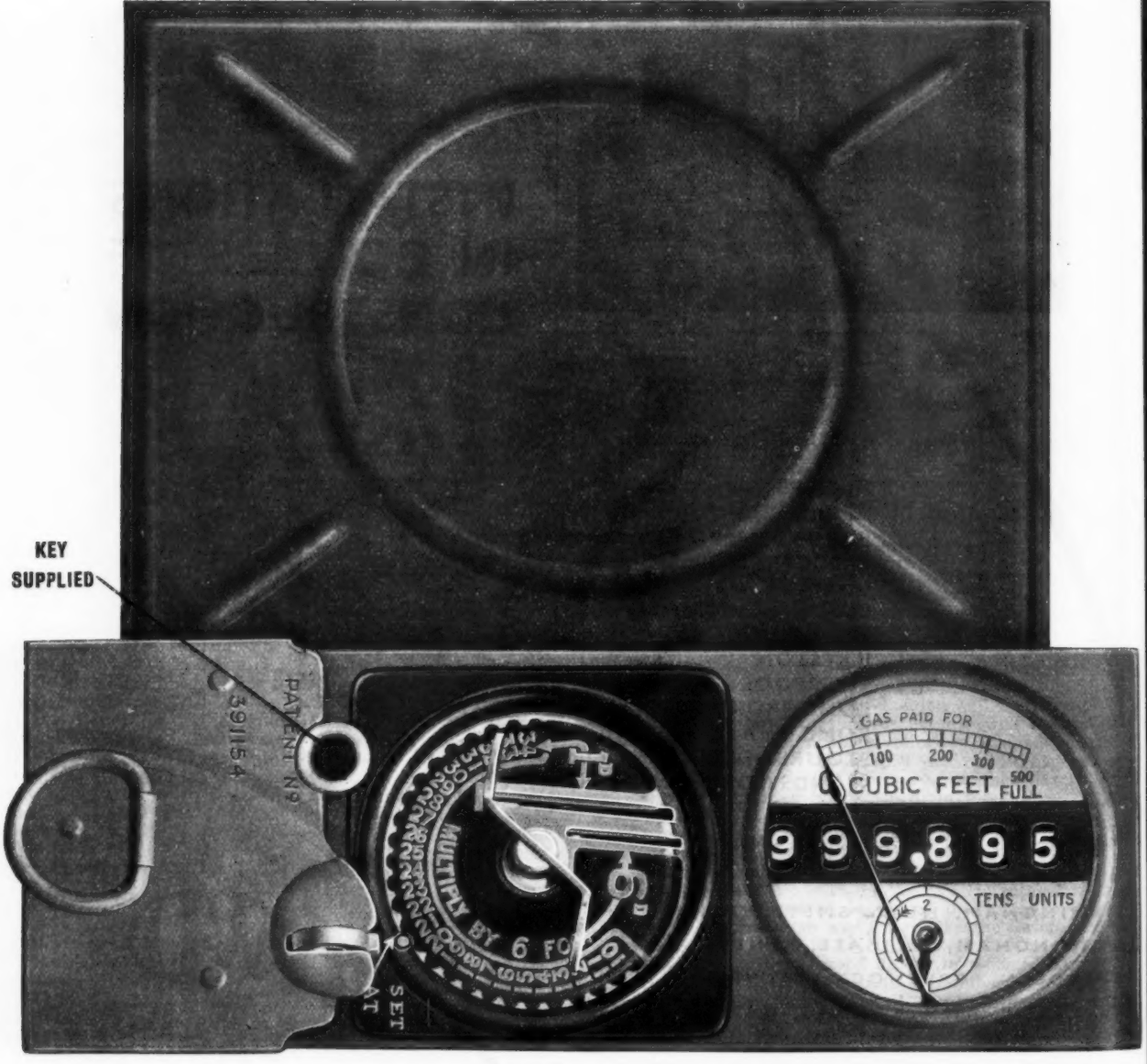

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WRITE FOR PARTICULARS AND PRICES

Institute of Fuel

At a Meeting of the Institute of Fuel on Wednesday, Oct. 9, Sir John Cadman, G.C.M.G., D.Sc., was installed as President, and delivered his Presidential Address. The meeting was held in Burlington House, Piccadilly, W. 1.

Sir Harry McGowan, K.B.E., LL.D., the Institute's retiring President, occupied the Chair at the opening of the meeting. Introducing Sir John Cadman to the Chair, Sir Harry said this country was becoming more and more fuel-minded, and he regarded the Institute as one that had great responsibilities to the public, in which it had hitherto not failed. He wished Sir John Cadman a happy and successful tenure of office.

Sir John Cadman formally occupied the Chair, and expressed his appreciation of the honour done him in asking him to take the reins of the Institute for the coming year. He then delivered his Presidential Address, in the course of which he said:

Great Britain has two primary fuels—coal and oil. What is the position in our national economy of those fuels and how can they best aid British industry? Since 1913 output of British coal has fallen 66 million tons from 287 million tons to 221 million tons. The causes of the decline are various—increased dependence by foreign countries on their own coal, greater competition for the export market, the use of oil in ocean-going vessels, and fuel economy throughout the world.

In contrast with coal, oil consumption in Great Britain has risen 6·6 million tons. Total imports in 1913 were 1·8 million tons, in 1934 they were 8·4 million tons. Contemporaneously, all forms of oil consuming vehicles and plant have greatly increased in numbers. The construction, operation, and maintenance of motor vehicles employ 1,257,000 individuals.

Post-war policy towards coal did not remedy any fundamental causes of trouble until 1930, when the Coal Mines Act was passed. This Act facilitated re-organization of the coal industry, and although full advantage of it has not been taken, it has been of great value.

The oil industry has been left free to carry on its own affairs until April, 1928, when oil products became the vehicle of a series of Customs duties. Motor spirit and diesel oil now bear a tax of 8d. a gallon. All other oils are taxed to the extent of 1d. a gallon. For a period of 9 years, motor spirit produced from indigenous sources is guaranteed a preference over imported spirit of 4d. a gallon.

What ought to be our policy towards fuel? Our policy should be to give British manufacturers every advantage that can be obtained from ample supplies of cheap fuel. A principal feature in applying that policy should be readjustment of the coal industry to take account of reduced demand. The coat must be cut to suit the cloth, which is no longer plentiful. Reorganization of the coal industry should eliminate the inefficient, reduce competition among the various units, and introduce better selling methods. The coal industry will not permanently benefit from preferences or subsidies.

To restrict the use of oil cannot materially aid coal. British coal production has fallen 66 million tons in 21 years, while oil consumption has risen 6·6 million tons.

Sir HARRY MCGOWAN proposed a vote of thanks to Sir John Cadman for his Address, and emphasized his remark that cheap fuel was essential to the prosperity of British industry. If Sir John did make out a case for more lenient treatment in the matter of duties on oil—and he had done so very fairly—his was not an *ex parte* statement. He would be the first to admit that the declining prosperity of the coal industry might call for heroic measures for its resuscitation. The more economical use of coal as a fuel and the increasing competition by foreign countries in foreign markets, resulting in diminished consumption of British coal, were factors they could not contemplate calmly. Coal was our great natural resource, and should be put to the greatest possible use. He had nothing but praise for what the oil companies had done for industry, transport, and many other purposes in this country by giving cheap supplies of oils, but if research did not demonstrate that we were making the most of this great natural resource, then the decline in the coal industry would go on relentlessly, bringing with it serious social problems.

Sir PHILIP DAWSON seconded the vote of thanks.

Sir JOHN CADMAN, in his reply, repeated that he was trying, in his Address, to put the case without bias. He did not wish anyone to go away with the idea that as one connected with the oil industry he was taking up the position that the duties were embarrassing to that industry. The consumption had gone up and the tax had been paid, but it was the public who had paid it. He did not wish it to be thought that there was any feeling in the industry that the country must not take every step within its power to become self-supporting in a commodity such as oil.

Sir WILLIAM LARKE, K.B.E. (Past-President), proposed, and Mr. S. MCEWEN seconded, a hearty vote of thanks to Sir Harry McGowan for his services as President during the past year. Mr. McEwen mentioned particularly the fact that Sir Harry had allowed the Institute to have the benefit of hearing the first public pronouncement on the work at Billingham on the hydrogenation of coal, in a Paper to be read before the Institute in November by Mr. Kenneth Gordon.

Sir HARRY MCGOWAN briefly responded, and said he would continue to take an active interest in the work of the Institute, and that his Company (I.C.I., Ltd.) was at its disposal in helping to deal with its problems.

In the afternoon a further meeting was held, at which Mr. H. R. Ricardo, F.R.S., delivered the Melchett Lecture, the subject of which was "The Progress of the Internal Combustion Engine and its Fuel."

ANNUAL DINNER.

The Annual Dinner of the Institute was held on Wednesday evening at the Connaught Rooms, Great Queen Street, London. Sir JOHN CADMAN was in the Chair and there was a company of some 600 members and guests and their ladies. As usual the Dinner was followed by dancing and a cabaret.

Sir DAVID MILNE-WATSON, proposing the toast of "Science and Industry," spoke of the manner in which science had been at the birth of every great industry in this country, and said it was most important that the older industries should always remember this, because unless they kept closely allied to science their existence would be a very short one. There was always the danger that the directors of the older industries might allow themselves to be lured into a false sense of security perhaps for the reason that they were making large profits—or should he say reasonable profits—for the time being, but if they did that they would soon find their particular industry a back number. If the older industries were to live and be in the forefront they must always be trying to attract the young and brilliant men who were coming along from time to time.

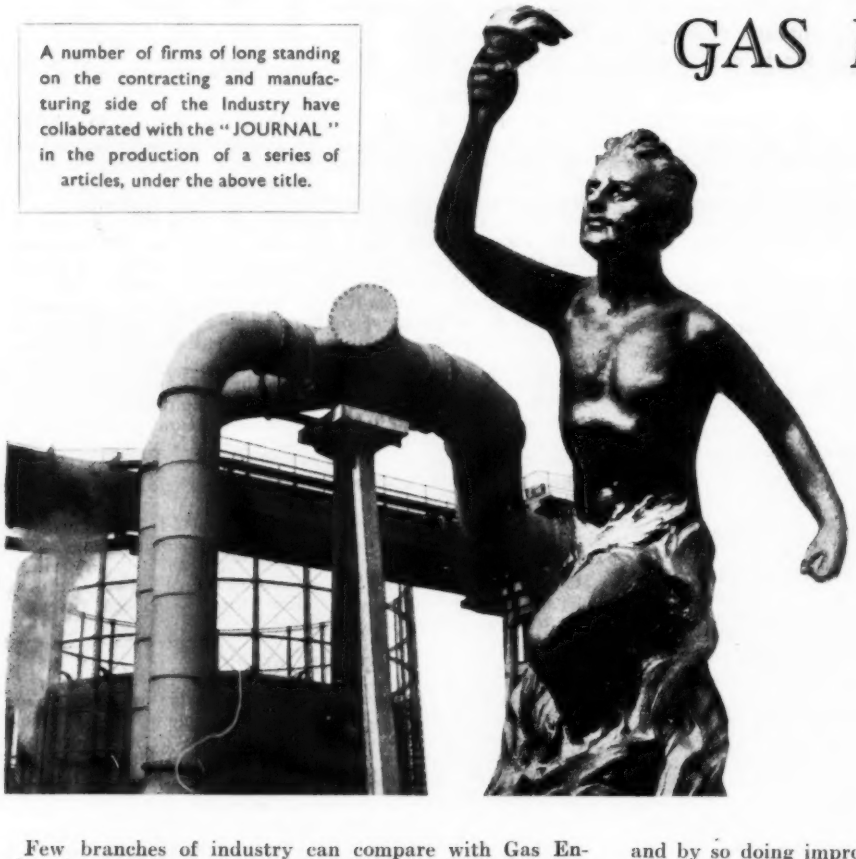
Sir FRANK E. SMITH, K.C.B., F.R.S. (Secretary, Department of Scientific and Industrial Research), responding to the toast, suggested that the real problem to-day was in the home. Millions of people were to-day burning coal in their houses in just the same manner as their grandparents did. They saw coal carried into houses in 10 or 20 dirty sacks and dumped into the cellars with a good deal of dust, and smoke was sent up the chimneys, polluting the atmosphere. It was all very well to say that electricity, or gas, or oil could do this and that, but it could not do it at the price which the average householder could afford to pay, and when they had a solution of that problem they would have a smokeless England and happy housewives.

The Rt. Hon. Lord RUTHERFORD, O.M., F.R.S., proposed "Fuel Industries," and the PRESIDENT, in the course of his response, said the coal industry in this country undoubtedly suffered from the fact that its only interest was in mining lumps of coal. The industry was efficiently run from the point of view of mining, but no industry in the world could expect to be successful if it doled out its commodity to other people like his friend Sir David Milne Watson—and he shuddered to think of the price which Sir David paid for his coal! The coal industry at the present time was not united and it was not complete and it never would be complete until it roped in people like Sir David Milne-Watson and others who were treating the coal and passing the product on to the consumer. A great revival was necessary in the coal industry which would have to go through the phase which the oil industry had almost gone through. It was definitely necessary that the coal industry should have at heart the requirements of its customers and seeing that they were properly met, and he hoped that the Institute of Fuel might become the Clearing House and do a great deal in that direction.

The PRESIDENT then presented the Melchett Medal to Mr. Harry R. Ricardo, F.R.S., who had delivered the Melchett Lecture during the afternoon.

LONG SERVICE TO THE GAS INDUSTRY

A number of firms of long standing on the contracting and manufacturing side of the Industry have collaborated with the "JOURNAL" in the production of a series of articles, under the above title.



United Gas Industries, Limited

Few branches of industry can compare with Gas Engineering, which comprises a wide field of civil, mechanical, and chemical engineering for the manufacture and distribution of gas. Gas engineers must have a specialized training in the design and construction of plant for gas production, understanding the reaction of refractory materials to the heat necessary for the production of gas. The Gas Engineer has also to decide before purchasing his raw material (coal) that it will be most suitable for his particular carbonizing plant to produce the greatest number of heat units in the form of gaseous, solid (as coke) or chemical in a variety of forms.

This achievement can be no "rule of thumb" business, but must be backed by wide experience in the many branches it embraces.

In the background of this great Industry, ever experimenting in new ideas as modern thought and practice advances, is the legion of specialists producing the plant for gas manufacture and its distribution, consumption, and measurement. It would be almost impossible to mention all the various items as produced. What a lot of annoyance and worry and often financial loss is involved by the merest flirtation with new ventures in designs and materials, so often produced on *modern* lines but not sound when judged by the standards of what is commonly termed "gas practice."

It is necessary, therefore, that the producers of the "plant and fixtures" of gas making and selling should also have a wide experience behind their products, to be competent to study reactions under all conditions which in the Gas Industry can vary as the proverbial weather.

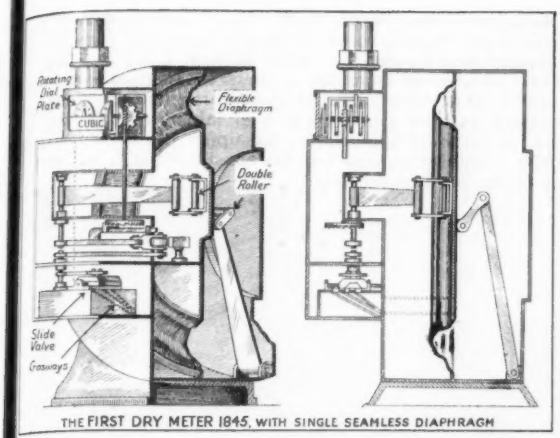
The Gas Industry since its inception has been served by individual firms who have built up reputations for good work and sound productions. Many of these products have varied but little since the original patented designs of well over a hundred years ago, and in no branch has this been so marked as in the gas meter industry. Gas meters are a "closed book," as it were, fixed on 1,500 districts each differing in gas conditions and probably left for half a lifetime to justify their existence or not. To many other branches this also applies. Is it surprising, then, that many of these descendants of the historical houses should want to combine in order to pool their experiences which have been handed on from father to son, and by so doing improve designs and simplify production to meet the requirements of the Gas Industry?

As an instance, such a group exists in the United Gas Industries, Ltd., comprising Messrs. Willey & Co., Ltd. (founded 1865 with the Sutherland Meter Company and the Vulcan Stove Company), Smith Meters, Ltd. (1834), J. H. Robinson & Co. (Liverpool), Ltd. (1869). Each individual Company is represented by its principal and other technical directors to form the Board of Directors of United Gas Industries, Ltd., which is as follows:

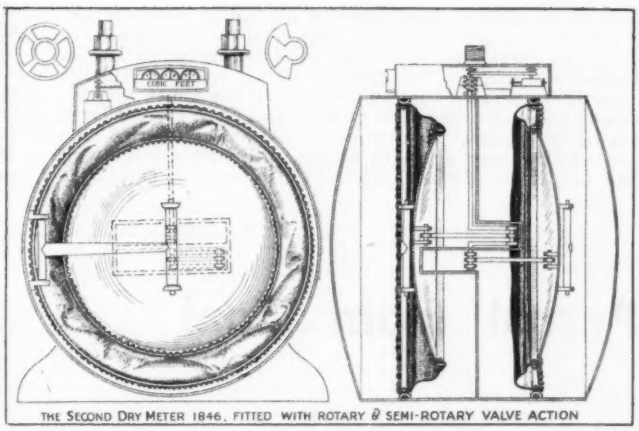
- Mr. S. E. CASH, Chairman of U.G.I. and Vulcan Stove Company and Director of Willey & Co., Ltd., J. H. Robinson & Co. (Liverpool), Ltd., Smith Meters, Ltd., Sutherland Meter Company, Ltd.
- Mr. S. SIMPSON, Chairman, Willey & Co., Ltd., and Sutherland Meter Company, Ltd. Lifelong experience in producing gas engineering plant.
- Mr. E. W. SMITH, Chairman of Smith Meters, Ltd. Direct descendant of the founder of the Company.
- Mr. S. ROBINSON, Chairman of J. H. Robinson & Co. (Liverpool), Ltd. Son of founder of Company.
- Mr. F. BLANCHFORD, Chairman of the Vulcan Stove Company, Ltd. Lifelong experience in producing Willey engineering products. Founder of the Vulcan Stove Company.
- Mr. F. THORP, Director of J. H. Robinson & Co. (Liverpool), Ltd. Son of Mr. T. Thorp, who with Mr. Marsh perfected the slot meter and supplied many meters to Liverpool Gas Company—the first to install slot meters in the North.
- Mr. T. WILLEY, Director of Willey & Co., Ltd., and direct descendant of the founder of the Company.

The House of Willey & Co. has manufactured, almost from its inception, all the necessary plant for gas-works, from retort to burner. Willey's patented products, such as purifiers, conveyors, screening machines, gasholders governors, station meters, &c., are installed throughout the world of gas production.

The family of Mr. S. Simpson (Chairman of Willey & Co., Ltd.) has been associated with the Gas Industry since its commencement. A Mr. Stephen Simpson erected a number of gas-works and made meters for some of the early inventors prior to 1823, when he commenced the



THE FIRST DRY METER 1845, WITH SINGLE SEAMLESS DIAPHRAGM



THE SECOND DRY METER 1846, FITTED WITH ROTARY & SEMI-ROTARY VALVE ACTION

manufacture of wet gas meters, and even at this period the parts were made to jigs and were interchangeable, including measuring drums. Mr. Simpson's grandfather and father subsequently succeeded to the meter making business and carried it on for many years.

Messrs. J. H. Robinson & Co. (Liverpool), Ltd., was founded by the late Mr. J. H. Robinson in 1869 for the manufacture of enamel dials for gas and water meters and other trades. The business proved a success, and dials were supplied all over this country and other countries, and later enamel letters were manufactured in great quantities.

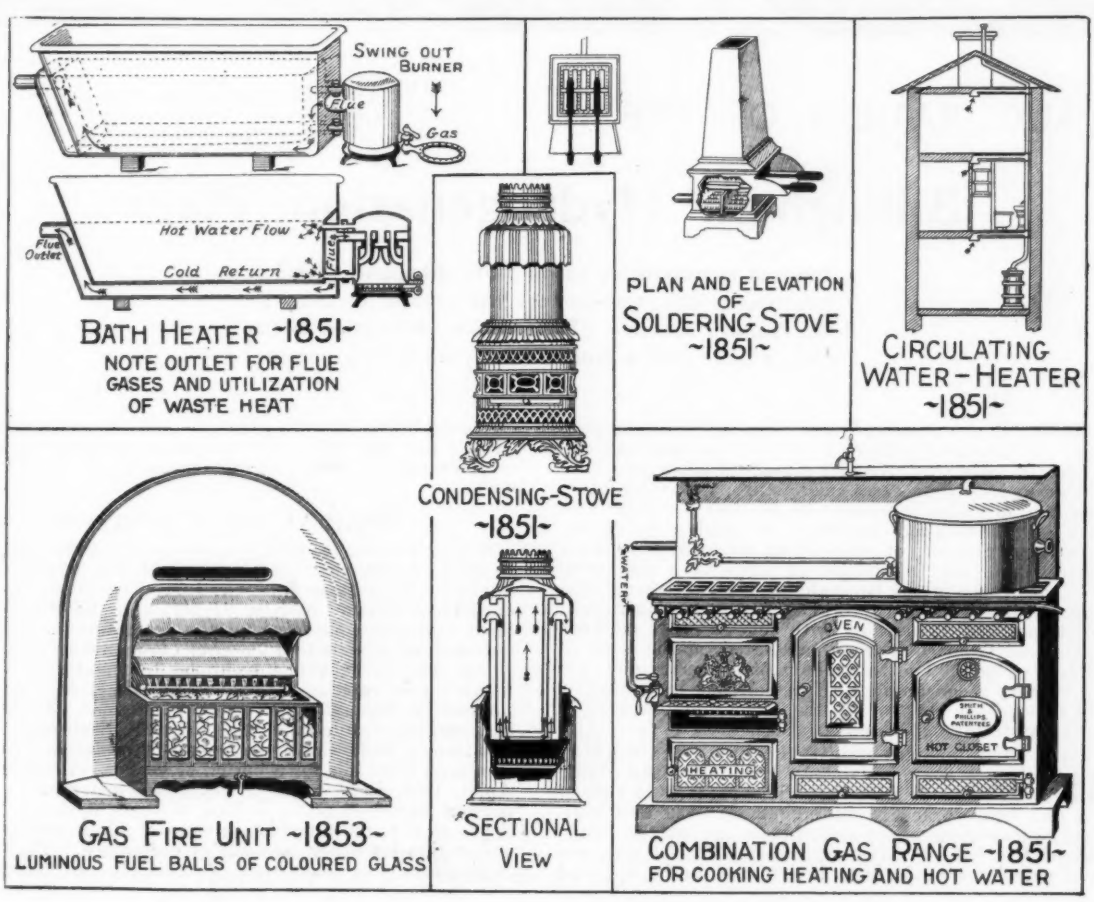
In 1902 Mr. Robinson decided to install a modern plant to produce indices complete with dials for the Gas Industry. This step brought increased business, and further plant was added to manufacture all descriptions of repetition turned work. In 1909, the manufacture of gas meters was commenced, and as the business grew, the Company were entrusted with contracts for the supply of meters to the chief gas undertakings in the country. It then became necessary to open branch works, and this was done in Edinburgh, Dublin, and London.

In 1923, the Company began to manufacture hot brass pressings, and to-day they are one of the largest producers in the country.

The House of Smith was first established at Snow Hill, City of London, in the year 1834 by William Smith, who manufactured gas meters of both the wet and dry variety, and many are the patented improvements registered in his name. That William Smith was an inventor who thought in advance of his time can be gathered from the many ideas relating to gas practice generally and to wet and dry meters in particular. Gas meters were his *forte*, and many were the improvements—for wet meters to prevent fraud, and dry meters having "jumping indices," and "leathers designed to pass larger volumes per revolution." Both rotary and semi-rotary valves appeared in his name in the early 'fifties, and designs for meters with a single diaphragm all go to prove that the founder was thinking far in advance of his generation.

In conjunction with Thos. Phillips, in 1851, William Smith designed gas tubes, tube connections, governors and valves, gas heaters, gas water heaters and circulators, also geysers and soldering stoves, together with a combination kitchen range to provide hot water, heating, and cooking, including even the splash-back, so popular during the last decade. In 1853 he patented a gas heating stove designed "to have the appearance of a coal fire."

George Browne Smith, son of William Smith, entered the business about 1865, when the address was transferred



from Snow Hill to Kennington Park Road, where it has remained ever since. George succeeded to the business in 1884, and carried on the useful work begun by his father. During his lifetime the greatest of all meter inventions came into use, viz., the slot meter, and the Smith prepayment meters were supplied under contract to several large gas undertakings. Contemporary with this period the present Chairman of Smith Meters, Ltd., Ernest William, and Lewis, his brother, entered the business. The death of George Browne Smith, in 1911, left the two sons, Ernest William and Lewis, to carry on the business. The present Company was formed as Smith Meters, Ltd., in 1915.

At the present time the associated Companies employ upwards of 3,000 hands and use approximately 33 million cu.ft. of gas per annum which is taken from twelve districts throughout the country to supply the various branch works. This estimated annual consumption is utilized in gas meter production alone.

Petrol from Coal

A "tank farm" for the storage of intermediate oils and finished petrol. The tanks are finished with a special paint to reflect the heat.

INAUGURATION OF THE

Billingham Hydrogenation Plant

The coal hydrogenation petrol plant of Imperial Chemical Industries at Billingham-on-Tees was opened yesterday by Mr. Ramsay Macdonald. The following description of the plant is taken from a brochure compiled for the opening.

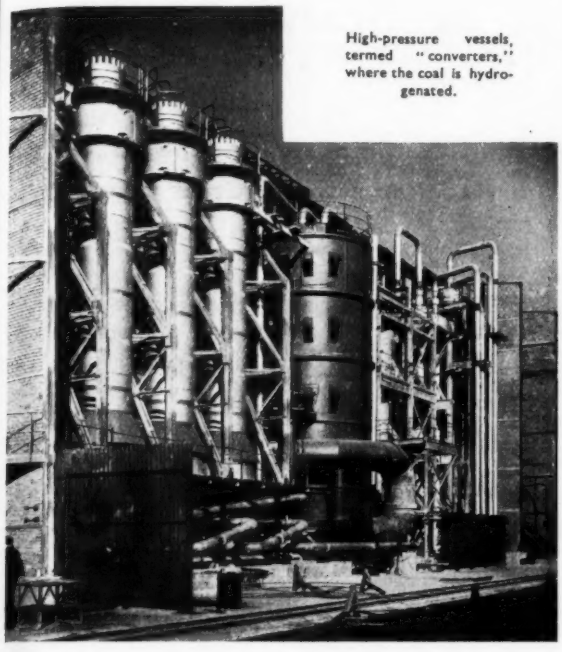
Flexibility is a valuable feature of the hydrogenation process, as tars and petroleum can be treated and the conditions arranged to give fuel oil, diesel oil, petrol, and liquefiable hydrocarbon gases such as propane and butane. Hydrogenation makes it technically possible to render this country independent of imported oil supplies (with the exception, at present, of lubricating oil). It is a great technical advantage to operate in units of a size comparable with those in the Billingham plant. Although the unit size is large and the capital cost correspondingly high, this cost compares favourably with that of other methods of making oil from coal, when calculated on the basis of liquid fuel output. The Billingham plant makes only 4% of the country's consumption of petrol, but its output is nearly as large as that of all the other home sources of motor spirit from coal added together.

The present Billingham plant is the first in the world to make petrol on a commercial scale by the hydrogenation of bituminous coal. A pilot unit which treated 15 tons of coal a day was worked in Billingham in 1930 and 1931. The only other commercial scale plants are at the Leuna Works of the I.G. in Germany, where 300,000 tons per year of petrol are made from brown coal or lignite, and Standard Oil Company's plants in America using petroleum oil as a raw material. Further plants are now being built in Germany for both bituminous coal and lignite treatment.

History of I.C.I. Development.

Research work by I.C.I. has been continuous since 1927. In 1931 an agreement was made with the other operators in the hydrogenation field, the I.G. of Germany, the Standard Oil Company of New Jersey, and the Royal-Dutch-Shell Company, resulting in the formation of the International Hydrogenation Patents Company to pool patent rights and to exchange technical information. Arrangements were made at the same time for marketing production through existing oil companies. In 1933, the Government announced the British Hydrocarbon Oils Production Bill, which guaranteed a preference on home-produced light oils for a period of years. The period from April, 1935, is 4½ years if the preference remains at the present figure of 8d. a gallon, 9 years if the preference drops to the guaranteed minimum of 4d. a gallon, and in proportion for other amounts of preference. The plant at Billingham was authorized immediately and construction

started in August, 1933. It was originally intended to produce 100,000 tons a year of petrol from coal. It was later decided to increase the capacity to 150,000 tons a year of petrol, the extra 50,000 tons to be made either from coal or from creosote oil and low-temperature tar. The first section was ready in January, 1935. Creosote oil



High-pressure vessels, termed "converters," where the coal is hydrogenated.

was used as the starting material, and the first petrol was made in February. The first coal unit was started in June, and the output is expected to reach the designed figure before the end of this year. The normal rate of production is 410 tons, or 123,000 gallons, of petrol a day. (One ton of petrol is 300 gallons.) Already 40,000 tons of petrol have been made, of which 27,000 tons have been shipped to the oil companies for distribution.

Coal Consumption at Billingham.

This is as follows:

	Tons per Year
For the manufacture of 100,000 tons per year of petrol from coal, and 50,000 tons a year of petrol from creosote oil and low-temperature tar (including coal actually hydrogenated, together with all that used for hydrogen manufacture and power production)	600,000
For purposes other than the manufacture of petrol . .	750,000
Total	1,350,000

or nearly 4,000 tons a day.

The ratio of 4 tons of coal to 1 ton of petrol produced can be maintained on a new plant (even if coal only is used), without creosote or low-temperature tar, owing to the improved methods of hydrogen manufacture which would be employed.

Employment.

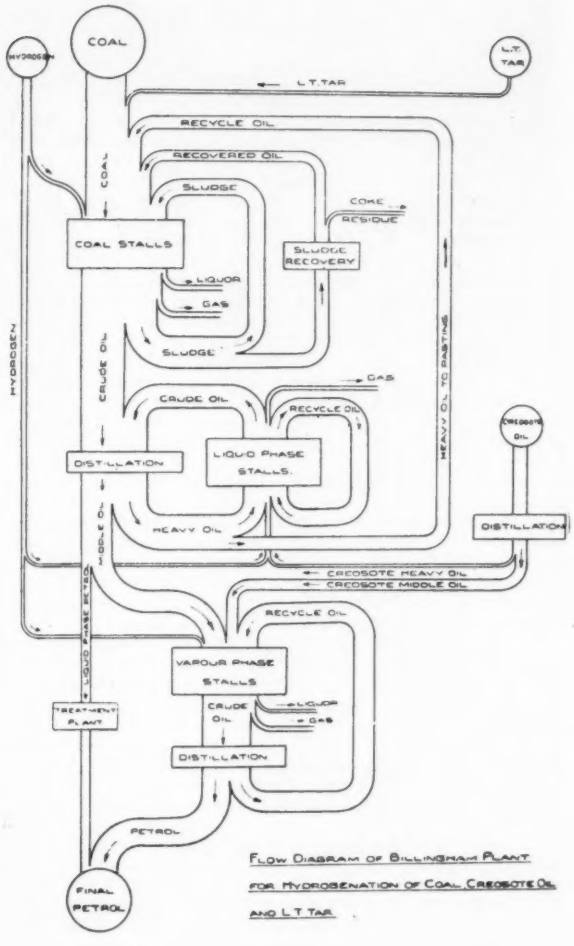
During the erection of the petrol plant at Billingham, the total numbers employed at the Works rose from 7,000 to a peak of 13,600 almost entirely on account of construction work. There was still greater additional employment at contractors' works where the various forgings and machines were made. New capital expenditure amounted to £3,000,000, which corresponds to the employment of 9,000 men for eighteen months. Of the 9,500 workmen now in normal employment at Billingham, about 2,000 are engaged on the manufacture of petrol, and necessary services, and research. The extra coal consumption corresponds to the employment of 2,000 miners.

Construction of Plant.

The plant took about eighteen months to build, and except for a few special instruments the whole was made in the United Kingdom. Special materials, never before employed in this country, were used. The steel industry deserves great credit for the successful production of plant from these special steels, particularly when the size and weight of the high-pressure portions are considered. A large amount of special machinery has been employed and throughout the workmanship of the contractors has been of the highest class.

Description of Process.

The raw coal is cleaned to less than 2½% of ash and is ground up with oil previously made in the process to make a 50% coal-in-oil "paste." This is injected against the working pressure of 250 atmospheres (3,700 lb. per sq.in.) and mixed with hydrogen. The mixture is heated up to reaction temperature, and liquefaction of coal takes place at 450° C. (850° F.) and 250 atmospheres pressure. A small heavy oil fraction containing the unconverted coal (5% by weight) and ash is treated for oil recovery and the coke residue is used as a fuel. The major part of the coal is transformed into lighter oils which are vaporized, and are recovered on cooling the gaseous products leaving the converters. The crude oil so obtained is distilled into heavy oil, middle oil, and petrol. Heavy oil is further hydrogenated, in plant exactly similar to that used for the hydrogenation of coal, to give middle oil and petrol. Middle oil resulting from these two steps is further hydrogenated in vapour phase converters, in which the vaporized light oil and hydrogen are passed over a solid catalyst. The crude vapour phase product is distilled, the residual middle oil being separated from petrol and treated again. The whole of the coal is thus transformed into a small solid consumable residue, gas, and petrol.



FLOW DIAGRAM OF BILLINGHAM PLANT FOR HYDROGENATION OF COAL, CREOSOTE OIL AND L.T. TAR.

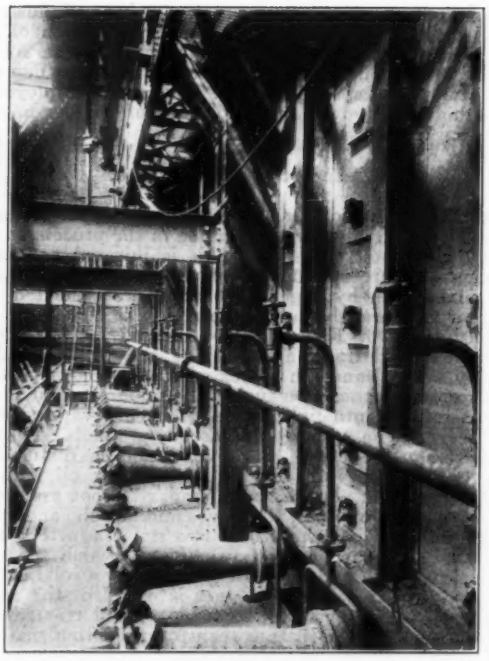
Creosote oil and low-temperature tars are either employed for making up the coal paste or distilled and the fractions introduced into the liquid or vapour phase stages as appropriate. These materials play no essential part in the main process of making oil from coal, but are conveniently treated along with the coal.

The final petrol, after a simple purification, is pumped to storage tanks beside the River Tees, from which it is shipped by steamers.

C.O.L. Intermittent Plant Inaugurated at Stalybridge

An installation incorporating the first Collin dry cooling plant in Great Britain

On Saturday, Oct. 5, the new plant erected at the Acres Lane Gas-Works of the Stalybridge Corporation was inaugurated in the presence of a large gathering.



A View of the Bottom Offtakes.

Among those present were the Mayor of Stalybridge, Alderman G. Potts, Alderman J. W. Greenwood, Chairman, and other members of the Gas-Works Committee, the Mayor of Ashton-under-Lyne, Councillor J. Townsley, Col. W. M. Carr, O.B.E., T.D., President of The Institution of Gas Engineers, Mr. J. E. Clegg, Southport, Mr. R. E. Gibson, Liverpool, Mr. W. B. M'Lusky, Halifax, and others well-known in the Gas Industry. The Mayor of Stalybridge, in welcoming the visitors, remarked that he hoped the new plant would fulfil the expectations of the Chairman and members of the Gas-Works Committee. Alderman Greenwood said in 1885 the Corporation took the Gas-Works over from the Stalybridge Gas Company. Since then all expenses of repairs, maintenance, and additions had been paid for out of revenue; their first borrowing was the £18,000 required for this reconstruction. Gas had been supplied to small consumers at 3s. 9d. per thousand cu.ft., or 9d. per therm. The old horizontal plant having become obsolete, the Committee decided to put in the new plant; it took up less room than would be needed for a horizontal plant of the size required. They hoped now to supply gas at a much cheaper rate and so attract new industries to a town which had suffered severely from the slump in the cotton trade. Mr. R. J. Restall, the Engineer and Manager, had been with them three years; he deserved great praise for the way in which he had done this work. Thanks were also due to the contractors for having built a good sound plant.

A vote of thanks to the Mayor and Alderman Greenwood was proposed by Councillor J. Bradbury, Vice-Chairman of the Gas-Works Committee, and was seconded by Mr. A. H. Lymn, Managing Director of Gas Chambers and Coke Ovens, Ltd. He remarked that Mr. Restall was to be congratulated on the foresight and capacity he had shown in his conduct of the affairs of the Stalybridge Gas Undertaking. Mr. Lymn concluded by presenting a silver salver to Alderman Greenwood and a fountain pen to Mr. Restall as souvenirs.

Col. W. M. Carr, in returning thanks for the visitors, said Mr. Restall was with him at Stretford for a number of years. Knowing his ability, he expected much from Stalybridge and knew he would not be disappointed. He agreed with Mr. Lymn that the improvement and cheapening of the manufacture of gas would not avail much unless backed by equal energy in selling. He hoped the time would come when they could allocate to gas and electricity the work which each could do most economically, and that the consumer would obtain unbiassed advice as to which was the better for his business.

Mr. J. H. Clegg said before coming to Stalybridge Mr. Restall was with him at Burnley for two years, where he paid particular attention to the blending of coal for the production of good quality coke.

Description of the New Plant.

In considering the requirements in the first place early in 1933, the Committee had in mind the fact that Stalybridge, although highly suitable for a residential town, was chiefly an industrial one; stress of this fact therefore was made and from it the scheme put in hand was evolved. The capital expenditure of £18,000, and the ultimate starting up of the carbonizing and other plants completes the first and by far the larger part of works reconstruction.

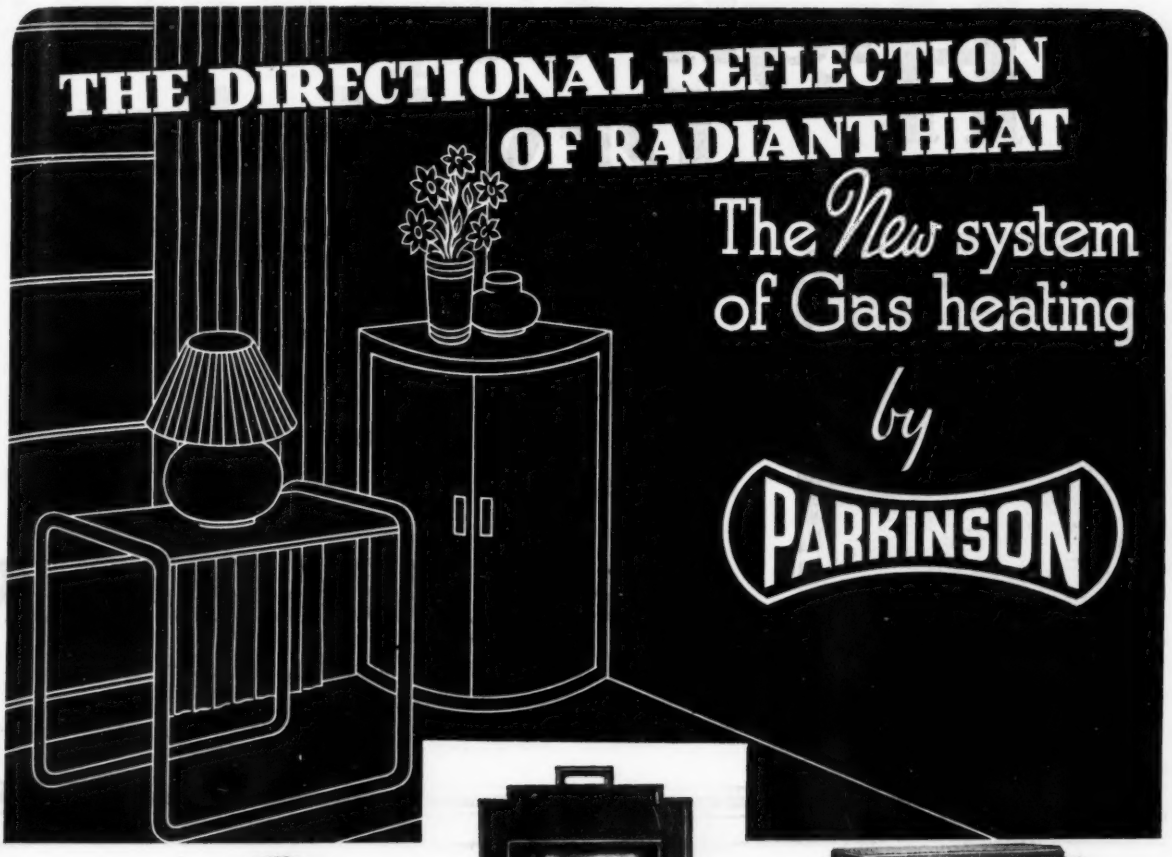
Alongside and on the same centre line as one of the existing hoppers, two new mild steel hoppers supported by brick piers have been erected. The layout of the coal hoppers was planned with a view to the mixing and blending of different classes of coals. Immediately underneath the coal hoppers a continuous rubber belt conveyor works in conjunction with a rotary mixing table, buffer hopper, and horseshoe coal filler for the skip hoist.

The coal from each hopper is delivered on to the belt by means of rotary feeders designed and supplied by the New Conveyor Company, Ltd., of Smethwick. Each feeder delivers a small quantity of coal on to the belt in the following proportions, 7 tons, 5 tons, and 3 tons per hour. The working capacity of the hoppers is about 60 tons. Such an arrangement enables blending to be done and gives a thoroughly mixed raw material. Mixing is ensured by the rotary table spreading the coal in a series of layers in the buffer hopper and further mixing takes place when the coal is distributed in the overhead bunker by a rotating chute, which chute is also used for discharging coke and breeze into their appropriate bunker compartments.

The skip hoist supplied by the Fraser & Chalmers Engineering Works (as Sub-Contractors to Gas Chambers & Coke Ovens, Ltd.) is fully automatic and deals with 15 tons of coal per hour. A brick built hopper is provided to take coke or breeze, the former being dealt with by means of a set of finger gates and measuring chute. The capacity of the hopper is about 8 tons, and the finger gates are placed in such position as to allow easy control of coke flowing into the measuring chute. The coal storage in the tower is 150 tons, equal to 3 days supply for the carbonizing plant working on full load. The coke and breeze hoppers are in like proportion so that in the event of an extension of the carbonizing plant equal to 50% of the present production, there would still be two days supply of coal, coke, and breeze. The layout of the plant provides for such an extension.

Having regard to the capacity of the main coal storage bunker and the need occasionally for testing coals, a division has been so placed that about 30 tons of a particular coal may be tested out on a working scale. At charging floor level a charging 'bus runs on overhead rails the full length of the bench. Coal is charged through gates into the two hoppers of the hand-operated charging 'bus. Each of these hoppers is fitted with an adjustable measuring cylinder so that the charge of coal to the chambers may be varied as required and the outlet of each hopper is provided with a drop sleeve which registers with the charging holes of each chamber. This device reduces smoke emission during the charging operation, and in addition

THE DIRECTIONAL REFLECTION OF RADIANT HEAT

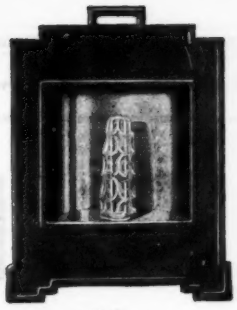


The *New* system of Gas heating *by*

PARKINSON

The
ZONEX
Portable
Gas Fire

Another triumphant development. The "Zonex" consists of a horizontal chromium reflector, above which is placed a unique heating element of patented all-metal construction embodying special alloys. No breakable refractory material is incorporated. The "Zonex" with its wide horizontal distribution will undoubtedly appeal greatly to consumers and further extend the selling field of gas.



The
PARAVEX
Portable
Gas Fire

The new system of directional radiation, pioneered by Parkinson, was successfully initiated by the "Paravex." This portable gas fire quickly attained immense popularity, and proved to be the most economical and convenient means of providing cosy warmth for any room at will.

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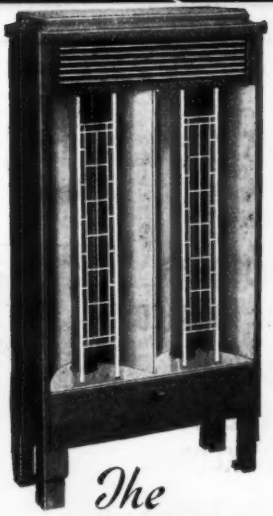

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Gas Radiator

The introduction of the "Ubic" marks a great step forward in radiator design—the new system of gas heating now provides a radiator which really radiates. The radiant heat is directed where it is wanted—into the room, resulting in more rapid room warming than hitherto obtained by gas radiators.

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OF BEST QUALITY THROUGHOUT

Diaphragms of improved construction
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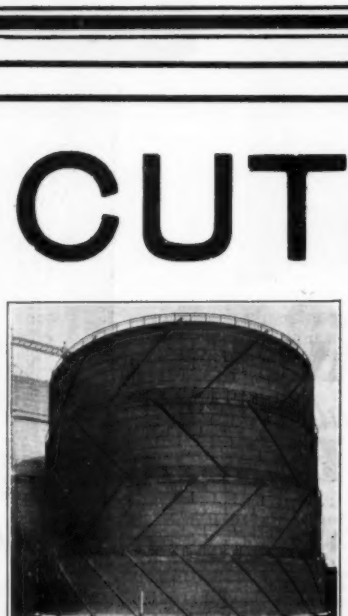

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four ducts, one in each corner of the tower, offer a means of ventilation. The combination of these two provisions has practically eliminated smoke nuisance; it is doubtful whether the charging operation can be seen from anywhere outside the carbonizing plant.

Carbonizing Plant.

The carbonizing plant which was designed and erected by Gas Chambers & Coke Ovens, Ltd., of London, has a nominal capacity of 50 tons of coal per diem. It consists of a bench of nine C.O.L. Intermittent Vertical Chambers, arranged in three settings each of three chambers, each chamber having a capacity of approximately 3 tons of coal.

The chambers themselves are built, except at the tops and bottoms, of the highest grade silica material. Partial recuperation of the air for combustion is provided; the recuperators are constructed of suitable fireclay material. Each chamber is carried on an independent cast steel frame which is fitted with a cast steel door and provision is made for steaming the carbonized charge. The bulk of the gas made is removed through top offtakes fitted with seal pots, and bottom offtakes are also provided to prevent the accumulation of pressure at the bottom of the chambers with its attendant disadvantages. Independent shut-off valves are fitted to each offtake. The patented seal pots are of self-cleaning type, and each offtake is fitted with a liquor spray; means is also provided for flushing the various mains. An external weir is fitted at the end of the tar and liquor main to ensure that a correct liquor level is maintained in the seal pot.

The plant was started up in summer at a time when the gas consumption in the town was at its lowest, but no difficulty was found in working the chambers on a 24 hours' carbonizing period, a thermal yield per ton of 72 together with the extraction of about 1·25 gallons of benzole was easily obtained, while on 18 hours' carbonizing periods 86 therms per ton were obtained together with the same extraction of benzole.

The ease of operation has been fully demonstrated by the flexibility of the plant, and from the running costs and results up to the present there is every reason to believe that the maker's claims will be fully justified.

Coke Dry Cooling Plant.

The principle of utilizing the sensible heat in the discharged coke has already been adopted in this country, but the Stalybridge installation is unique in its simplicity and also that it is the first Collin dry cooling plant in the British Isles; the overall design provides the first direct combination of intermittent vertical carbonizing chambers and coke dry cooling in the world.

The Collin coke dry cooling plant consists of a battery of three cooling chambers positioned directly beneath the carbonizing chambers, each cooling chamber serves a setting of three carbonizing chambers. The cooling chambers are built of special firebrick, the sloping bottom of each chamber is covered with cast-iron plates arranged in louvre formation. Sand sealed charging doors and self sealing discharge doors are fitted to each chamber and below each discharge door is a sloping chute provided with finger gates for splitting the coke discharge. Each chamber is connected by a short flue provided with a hot gas valve to a main flue which runs the length of the battery, and is connected at one end to a Spencer-Bonecourt waste-heat boiler provided with a superheater.

The hot coke from the carbonizing chamber is discharged into the cooling chamber below through a discharge 'bus which is hand operated and which carries the lifting gear for handling the cooling chamber charging doors. The charging door is replaced, the hot and cold gas valves opened, and inert gases are circulated through the hot coke and the boiler; the sensible heat of the gases is thus given up in the boiler and the cooled gases returned to the cooling chambers. After cooling is completed, the hot and cold gas valves are closed, the discharge door is opened, and the cooled coke discharged through the finger gate controlled chute to a telpher skip.

Producers.

Two independent step grate producers supply the necessary gas for heating the settings and each producer is fitted with auxiliary steam blowers to enable breeze to be used if necessary. The producers are connected to a producer gas flue which is common to the whole bench, so that either producer may be shut down without interfering with the production of the gas from the whole plant. A separate dampered connection is provided from the common flue to each setting, thus permitting individual control.

The producers are fed by means of tube feeders, the inlets are at the same level as the oven charging floor; the discharge end of the tube feeders enter directly into the producers.

The system of heating the C.O.L. chamber is worthy of special mention in that there are multiple burner flues extending to approximately one-third the height of the chambers. These, together with a horizontal arrangement of the heating flues, enable good top temperatures to be obtained with moderate bottom temperatures, consequently securing three desirable carbonizing features—viz.: (1) High average wall temperature, (2) moderate maximum temperatures, and (3) moderate temperature gradient. The heat control to the various parts of the setting is obtained by damper adjustment, and the final control of the waste gas passing from each setting is by means of a single individual damper working on the main waste gas flue. The main flue on which is placed No. 2 waste-heat boiler then passes to the chimney. An important feature of the plant is that any of the three settings may be shut down without affecting the others, and also the settings may be worked simultaneously at different temperatures and also at different carbonizing periods.

The area in the north end of the house is large enough to allow for an increase in plant sufficient to produce about 500,000 cu.ft. per diem, and having this in mind, the mains and services, and also the coke dry cooling boiler, are large enough to deal with such an increase.

Coke Handling Plant.

The mechanical parts of this plant, together with the patent screens, the first of their kind, were installed by Messrs. Aldridge & Ranken, Ltd., London and Bath, and the storage hoppers, buffer hopper, conveyor supports, and junction platform were erected by the Gas Department.

The sizes of coke were decided upon by the experience of the demand which had developed since 1931; further, in an effort to provide screened large coke provision was made by means of a simple chute to accommodate any requirements. The sizes ultimately specified were:

(*a*) Large screened unbroken coke (this size takes out all under 2 in.)	Large
(*b*) 3 in. to 2 in.	Graded
(*c*) 2 in. to 1 in.	Domestic units
(*d*) 1 in. to $\frac{3}{8}$ in.	Smithy nuts
(*e*) $\frac{3}{8}$ in. to $\frac{5}{16}$ in.	Riddled breeze
(*f*) $\frac{5}{16}$ in. down	Breeze

A large percentage of riddled breeze is sold and the remainder is now used in conjunction with the new carbonizing plant for charging on to chamber bottom doors before the actual coal charging is done.

The screens are an adaptation of a debreezing device made by the patentees, and consist essentially of a steel framework supporting a screen bed formed of hard cast-iron bars of special design. These bars are set parallel one with the other and coupled on each side by connecting rods so that the whole of the screen is given a rocking movement, motion being given by means of an eccentric.

An extension to the engine house was made for the purpose of housing an electric generating set made up of coupling together an existing Crompton-Parkinson Dynamo and an Allen's 2 Crank Compound Vertical Totally Enclosed 70 B.H.P. Steam Engine.

Benzole Plant.

A benzole plant by Messrs. W. C. Holmes & Co., Ltd., of Huddersfield, was installed at the end of 1933 to work along with a washer, which was used some years earlier for the extraction of toluol. This plant is large enough to extract 2½ gallons of benzole from one ton of coal.

The second and smaller part of works reconstruction has received the preliminary attention of the Gas-Works Committee, and a scheme is in course of preparation dealing with the provision of such additional plant and machinery as will make the Works quite up-to-date.

The scheme will include the provision of a new distant-control telpher machine together with reconstruction of existing track. A new layout for tar and liquor storage and handling together with the installation of a concentrated liquor plant will also form a part; this will necessitate rearrangement of the washing and scrubbing plants. So that the Works and Offices are adequately and economically heated during the winter season, an exhaust vacuum system is proposed. Attention will also be given to renovating small buildings housing such plant as governors, valves, meters, &c., and the shops and stores will be refitted.

Another Striking Gas Display

The Gas Exhibit as seen from the Main Entrance.

AT THE

North London Exhibition

The Tottenham and District Gas Company have once more staged a very fine display at the Tenth Annual North London Exhibition which opened at the Alexandra Palace, Wood Green, on Oct. 9 and runs until Oct. 26.

A study of the regular exhibitions year by year is undoubtedly one of the best methods of following the progress of an industry. The exhibition affords an opportunity to bring before the public the most modern equipment in a manner that cannot be achieved quite with the same force either in the showroom window or through the medium of the Press.

We have had the opportunity of visiting each autumn for many years past the display of the Tottenham and District Gas Company at the Annual North London Exhibition, held in the Alexandra Palace, Wood Green; and looking back over the previous year, it is possible to trace the amazing developments that have taken place, not only in the advanced design of the appliances exhibited, but in the different conception of "display-craft." Year by year we have congratulated the Tottenham Company upon "a finer show than ever before" until it becomes, perhaps, less than a compliment to suggest it again—however true the statement may be. Nevertheless, they have again staged a magnificent display, and one fully worthy of the great Industry it represents. From the mere "stand" of a few years ago, the Company's display has grown to impressive proportions and incorporates the most modern ideas of showmanship.

The Company have once more secured the whole of the area immediately inside the main entrance to the Palace, and, by ensuring in this way that every visitor to the Exhibition passes through the gas display, have achieved a valuable piece of propaganda on behalf of the Industry. Most striking is the feature which greets the eye upon entering the Palace—a clever combination of a fountain of hot water with a naked flame actually playing in and around it, symbolical of the natural geyser and an impression of the origin of "hot water on tap."

Beyond this fountain the centrepiece of the display towers above the exhibits in the form of a great "Arc de Triomphe," with a gas flame emerging from a Grecian (or is it Roman?) gilded urn in the centre of the arch. Arranged about the foot of the arch is a display of gas fires of all types and in a wide variety of pleasing colours.

A section is devoted to hot water appliances, various types being shown in operation. Two multi-point machines supply taps fitted at some distance away, so that the water may be turned on and the appliance be seen to light up, the hot water flowing instantly. The cooker display embodies a comprehensive range of all the latest models in attractive coloured finishes. A section is set aside for cookery demonstrations, which are held three times daily, while continuous demonstrations are also being given of Dean's gas washing machines.

The gas lighting fittings are particularly noteworthy, and separate sections are devoted to displays of Main's and Parkinson's appliances, though the apparatus of all the leading manufacturers is well represented. A small industrial section contains a Potterton's "Rex" boiler in grey mottled enamel finish, which together with a Ruston Hornsby motor operates the fountain previously referred to.

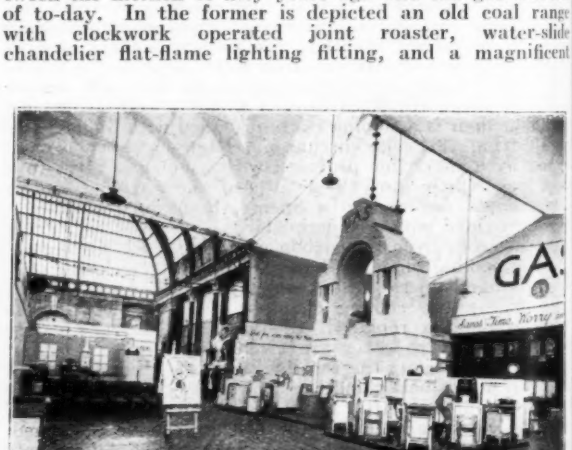
Further Exhibits.

Adjacent to the main gas exhibit are a number of other displays by well-known firms. The Ascot Gas Water Heater Company are showing their latest appliances, including an interesting example of how to connect up a multi-point heater as an alternative to an existing coke boiler system. J. Brockhouse & Co., Ltd., are showing examples of their "C.C." coke and gas grates, while C. H. Kempton & Co., Ltd., exhibit a number of their "Kaye" coke fires, all of which are fitted with their patent rocking bar attachment. The new "Southern" coke fire by SoFono, Ltd., is another interesting addition to the coke fire range, while this firm are also showing their small domestic coke boiler in enamel finish.

Above the main entrance to the Exhibition a large gas sign is effectively floodlighted at night.

In another section of the Exhibition are examples of modern kitchens, and it is a sign of the times that gas appliances are included in almost all of these. An all-gas kitchen has been arranged by the Tottenham Company, and this contains Peerless kitchen equipment in pleasing green finish, with gas appliances to match—including cooker, water heater, washing machine, refrigerator, and switch-controlled lighting fitting. Gas apparatus is also included in the Easiwork Kitchen, the Ideal Home Kitchen, and the "Comfy" Kitchen. One of the model houses also contains a gas cooker and plug-in points in every room.

Messrs. Hobbs Wilson, of Wood Green, one of the principal contractors to the Tottenham Company, are again exhibiting a number of gas and coke appliances. Of particular interest on this stand is the comparison between the kitchen of fifty years ago and the gas kitchen of to-day. In the former is depicted an old coal range with clockwork operated joint roaster, water-slide chandelier flat-flame lighting fitting, and a magnificent



A Further View of the Tottenham Company's Display at the Alexandra Palace.

array of old junk generally associated with the kitchens of our grandmothers. In contrast is the modern kitchen with its shining enamel fittings and labour-saving operation, including gas cooker, refrigerator, water heater, and washing machine—a very fine advertisement, in fact, for gas. Similarly, a row of lighting fittings shows the developments in this direction from the original Bray, Peebles, batswing, and Argand burners, through the days of the upright mantle, up to the present switch-controlled

equipment. Ideal boilers and radiators are also in evidence here, including the "Cookanheat" in enamelled finish, and further "C.C." fires.

The North London Exhibition as a whole tells a good story for gas and one on which the Tottenham and District Gas Company and the other firms concerned are to be congratulated. In addition, we understand that as many as fifty other exhibitors at the Alexandra Palace are using gas equipment in connection with their displays for one purpose or another.

It may be mentioned here that an entirely new restaurant and kitchen have recently been completed on the most modern lines at the Alexandra Palace, the latter, capable of catering for three hundred persons at a time, being equipped with the most up-to-date gas apparatus for all purposes.

Criticisms of Holding Companies

The Deal and Walmer Gas Company's Special Order

Fears as to the possibilities of abuse which might follow the acquisition by holding companies of shares in gas companies were expressed by objections at the Board of Trade enquiry, conducted by Mr. J. F. RONCA, O.B.E. (Director of Gas Administration), at Westminster on Tuesday, Oct. 8, into the draft Special Order promoted by the Deal and Walmer Gas Company. Those fears were dismissed by Sir David Milne-Watson as groundless, except on the assumption that gas directorates were composed of lunatics.

The Order promoted by the Deal Company was one concerned mainly with matters of an administrative character, the purpose being to bring up-to-date a number of provisions applying to the Company. It contained clauses dealing with the Company's meetings, the appointment of officers, and miscellaneous matters relating to the supply of gas, legal remedies, &c.

Mr. H. Royston Askew was Counsel for the Company.

Objections to three particular clauses were lodged by the Town Council of Deal, by Mr. J. G. Tooms, and by the Deal, Walmer, and District Chamber of Commerce. These clauses were of common form, to give the Company discretion as to the place at which it could hold its annual general meetings, to empower the Company to appoint a Managing Director if necessary, and to remove the disqualification of a Director who might be interested in any contract made with the Company. The Company did not admit that the objectors were entitled to appear at the enquiry, on the ground that these were matters of internal administration; but Mr. Askew did not press that point.

The Deal Town Council was represented by Mr. D. A. Daniel (Town Clerk) and Mr. J. G. Tooms (Chairman of the Legal and Parliamentary Committee, and Mayor-elect); the Chamber of Commerce was represented by Mr. Albert Hill. Mr. Tooms also opposed as a minority shareholder in the Company, a ratepayer, and a gas and coke consumer.

Mr. ASKEW pointed out that the Company was incorporated in 1864, so that some of its statutory provisions were not in accord with modern practice. The majority of the shares of the Company were acquired about three years ago by the South Eastern Gas Corporation, Ltd., by voluntary sale and purchase.

The first clause to which objection was taken provided for the repeal of the limitation in the Company's Act of 1864 that the Company's general meetings should be held within the limits of supply and gave power for the holding of the meetings either within or beyond the limits, as the Directors might appoint. In emphasizing that this was essentially a matter of Company administration, Mr. Askew said that no doubt 70 years ago, when the Company was formed, the shareholders were largely local people, but that was not the case now; it was only reasonable that the Company should hold its meetings where it liked. The total ordinary share capital was £74,815, of which £47,848 was held by the South Eastern Gas Corporation, the remaining £27,067 being held by other shareholders, 97 in number. Of that £27,067, £16,639 was held by 52 shareholders who were not resident within the Company's limits of supply; only £10,728 was held by 45 shareholders resident within the limits. Thus, only £10,728 (14%) out of £74,815 of the capital was held by people resident within the Company's limits.

The objectors asked that the annual general meetings of the Company should be held within the Company's limits of supply. As showing the "active" interest taken by the shareholders in the place of meeting, Mr. Askew said that at the last three annual meetings in Deal the numbers of local shareholders who had attended in person were 5, 4, and 4 respectively (omitting shareholders who were also members of the Company's salaried staff). In those circumstances, the Company asked that it should not be compelled to hold its meetings in Deal, a request which seemed to be entirely reasonable. It was not the modern practice, and had not been the practice for years, in Acts of Parliament or in Orders made by the Board of Trade, to impose restrictions as to the places of meetings.

Referring to the objection of Mr. Tooms, Counsel said that questions as to place of meeting must be decided by the majority of shareholders. The matter had been discussed by a large meeting of shareholders, and no doubt Mr. Tooms had expressed his views there. Having failed to convince the majority of shareholders in the Company, he was in effect asking that the Board of Trade should become a domestic forum on matters of Company administration. Mr. Tooms had made reference also to the Directors' fees. They amounted to £500 a year among five Directors, which was a very reasonable figure compared with other undertakings of similar size and scope; it was a great deal less than was paid in the days before the present régime. There was no allegation that the Company was not properly administered; that was an important fact.

Objections of the Town Council.

The objections of the Corporation bore a somewhat curious resemblance to those of Mr. Tooms, stating that if meetings were held in London, the shareholders and consumers in Deal had to travel to London or had not the opportunity of attending the meetings. Counsel urged that the Town Council was not entitled to appear before the Board of Trade on behalf of shareholders of the Company. It was not alleged that the consumers in Deal had any grievance against the Company on this matter, and even if they had, the Town Council would not appear at shareholders' meetings.

The TOWN CLERK submitted that the Council had the right to make any submission it pleased with regard to the Order.

Mr. ASKEW replied that if that were so, anybody could make any objection of any sort or kind to any legislation, and there would be no limit to the opponents.

Mr. RONCA said the Board of Trade must be satisfied that an objector was properly interested; it was not the fact that *anybody* could object.

Mr. ASKEW, referring to the stated objections of the Chamber of Commerce, said they were identical with those of the Town Council, and again he suggested that the Chamber of Commerce had not the interest in the shareholders' meetings that would entitle them to be heard at the enquiry on the particular clause.

The other two clauses to which objections were taken were in common form and appeared in literally hundreds of Gas Acts and Orders. The first empowered the Directors to appoint one of their body to be Managing Director, and to fix his remuneration. Counsel pointed out that the circumstances of management of a Company, of course, varied from time to time, and efficiency, concentration of executive power, and closer liaison were best achieved in certain circumstances by the appointment of a Managing Director. It was highly desirable that a Company should have power to make such an appointment. It was urged by the objectors that the power should not be granted to this Company in view of the special circumstances, the control being in the hands of a combine—the South Eastern Gas Corporation. But that was simply prejudice. The mere fact that a certain part of the stocks and shares of the Company was held by a particular party was not a reason for refusing the clause. If the objection had any significance at all it must be to suggest that if the majority of the shares were held by one group, common powers were to be refused. That was a new doctrine in Parliamentary law and practice. It is stated in the objection by the Town Council that the interests of the South Eastern Gas Corporation were purely financial; that, however, was not true. It seemed to have been forgotten that the sliding scale, whereby dividends could not be increased until the price of gas was reduced, rendered the interests of the shareholders and the consumers identical; it was in the interests of both that there should be efficiency, economy, and cheap gas.

The remaining clause to which objection was raised provided that no person should be disqualified from being a Director by reason of his holding any office or place of trust or profit under the Company, or by reason of his being interested in any contract with the Company; but the nature of his interest in a contract should be disclosed to the Directors, and he must not vote in respect of any such contract. The Town Council suggested that the clause was objectionable, even with the safeguards provided in it, for the Board of Directors might be quite unsuited to their position and it might be to the prejudice of the Company and the consumers; the accounts might fail to reveal the true position of affairs. That was an unworthy insinuation, especially from a Council whose own members enjoyed already the benefit of exactly similar conditions. What would Deal think if one suggested that the members of the Town Council might be quite unsuited to their position, and, therefore, that provisions which applied to other Councils should not apply to Deal?

Operation of the Sliding Scale.

Sir *David Milne-Watson*, M.A., LL.D., D.L. (Governor of the Gas Light and Coke Company, Chairman of Directors of the Deal and Walmer Gas Company, and Chairman of the Board of the South Eastern Gas Corporation), gave evidence and confirmed Counsel's statement concerning the Deal Company's capital. The standard price of gas, he said, was 15d. per therm, and the standard dividend 5%. In the financial year ended

June, 1935, the selling price of gas was 9·6d. per therm, so that a dividend of 8 per cent. was authorized on the ordinary shares; the dividend actually paid was 7¾%. There had been no change in the dividend and nothing had been added to the reserve fund during the last three years. Certain savings had been effected, but had been spent on the extension of the Company's business —increased main laying and public lamps, and repairs to and maintenance of works. The clause with regard to place of meeting would merely give discretion in that matter, and there was nothing to prevent the Company holding meetings in Deal. But that was very different from being forced to hold general meetings there. The latter would be a most unusual provision.

The interests of the South-Eastern Gas Corporation were not purely financial. The Directors were in every sense of the term "gas men," and there was no reason why their policy with regard to gas in Deal should be different from their policy elsewhere. The sliding-scale provided a complete answer to the accusations.

Sir David was subjected to cross-examination by all three objectors, and various possibilities were put up to him as to the abuses which might arise where a holding Company, responsible solely to its own shareholders and not subject to the same restrictions as applied to the ordinary statutory gas company, held the majority of the shares. At the same time, no question of lack of confidence in the present Directorate of the Deal Company was suggested; indeed, several times the objectors expressed their confidence.

It was urged by Mr. Tooms that the Directors of the Deal Company were in effect nominated and appointed in virtue of the majority shares held by the Gas Corporation; the latter, by virtue of its voting power, decided the remuneration payable to the Directors of the Deal Company; and the Corporation had no direct responsibility to anyone other than its shareholders. He asked what body existed to protect the interests of consumers. To these questions Sir David replied that the Deal Company decided the remuneration of its Directors, and he refused to divorce the Directors of that Company from their responsibilities as such. As Chairman, he was particularly concerned with the interests of the consumers. Although consumers could combine if they desired as a means of protection of their interests, he knew of no such combination.

When he was asked whether the South Eastern Gas Corporation had been able to effect economies and so benefit the consumers during its period of control, he said it certainly had. There had been annual savings of £155 in salaries (including Directors' fees); of more than £1,000 in the purchase of coal: nearly £500 in the purchase of stores; and £100 on insurance. The Directors had not been able to reduce the price of gas in Deal yet, for they had a great deal to do in connection with maintenance of works and plant. An additional £500 had to be spent on repairs to works, more than £700 on mains, meters, and stoves which required immediate attention, and about £300 on public lamps. The necessary spending of the savings in this way must benefit the consumers in the long run. In Kent the Corporation had been able to effect eight or nine reductions of prices so far, and it awaited the opportunity to do so in Deal. The inevitable result of the work in Deal to improve the position of the Company would be a reduction of the price of gas.

The question was put by Mr. Tooms as to whether the alleged inconvenience to Directors in attending general meetings in Deal was a valid and sufficient excuse to ignore the opinion of the local authority and the Chamber of Commerce that the meetings should be held in Deal. After emphasizing that that was a matter to be decided by the Company on its merits, Sir David said that this matter obviously was not a burning question in Deal, for when notice was given last year that it was to be dealt with, only four or five local shareholders had attended to vote.

Appointment of a Managing Director.

Mr. TOOMS asked whether, assuming a fully qualified and experienced engineer and manager was in charge of the undertaking, any improved economy and efficiency could reasonably be expected as the result of appointing a non-resident managing director.

Sir *David* replied that such an appointment was not required to be made at the moment, but one did not know what might be required at some future date; it might be found of great advantage to make such an appointment.

Mr. TOOMS asked if there was a case in which the Board of Trade had granted the power to make such an appointment, after objection had been raised, to a Company under the domination of a financial combination.

Mr. ASKEW said that in his experience the clause had not been objected to before.

Sir *David* commented that reference to a financial combine indicated prejudice. It seemed to be suggested that because holding companies had come into existence and invested their money, the ordinary practice of Parliament and the Board of Trade was to be stopped and a new set of regulations must apply to such companies.

The TOWN CLERK, at the commencement of his cross-examination, said the Deal Corporation had the greatest respect for the Directorate of the Deal Company as at present constituted, and the Corporation had been very good customers of the Company for many years.

Sir *David* agreed, and added that the relations between the Corporation and the Company had been good.

In reply to the Town Clerk's statement that previously the Company was purely a local concern, Sir David replied that it was not so immediately before the South Eastern Gas Corporation had bought shares. East Kent had controlled the Deal Company before that, and East Kent was controlled by somebody else, but he had never heard a word of this fear of control until last year.

The TOWN CLERK asked if the Gas Corporation had the financial interests of its shareholders primarily before it rather than the interests of the local gas consumers.

Sir *David* replied that it certainly had not.

The TOWN CLERK asked if it were not possible as a matter of ordinary administration and commerce that perhaps momentarily the interests of the Deal consumers would have to stand aside for the interests of the consumers in, say, Gravesend or of other affiliated companies.

Sir *David* replied most emphatically that that was not so, and challenged the Town Clerk to point to anything of the kind.

The TOWN CLERK, referring to the interest of Directors in contracts made with the Company, pointed out that the disclosure of a Director's interest in any contract would not be made so publicly as the disclosure by a member of a Town Council of his interest in any contract made with the Council.

Sir *David* would not agree that there might be conflict of duty and interest on the part of a Director.

A suggestion was made, both by the Town Clerk and by Mr. Hill, that it would be possible to appoint a Managing Director of the Company at a very high salary, which would become a revenue charge, and it could go into the coffers of the Gas Corporation, the price of gas in Deal might be raised as a result, but the price of gas in Deal would not control the profits of the Gas Corporation.

Sir *David* replied that if the price of gas in Deal were increased the dividend paid by the Deal Company would decrease, and the effect would be to ruin the Gas Corporation as the principal shareholder. One must depend on some sort of sense on the part of Directors.

Safeguards for the Consumers.

Re-examined, Sir David agreed that there were four safeguards against such action as had been suggested—the business interests of those concerned, the sliding scale which controlled the price of gas and the dividends, the legal remedy against Directors for misfeasance, and the ultimate and recurring control of Parliament and the Board of Trade.

Mr. *Tooms* gave evidence on behalf of the Deal Corporation. He recalled that in 1929 or 1930, when many of the shares of the Deal Company passed into the hands of one group, there was a certain amount of alarm in the town with regard to it. But until the application for the present Order was made there had not been an opportunity for the town to express their views on the matter. With regard to meetings being held in Deal, he said it would be a convenience to the 45 shareholders there, and would inconvenience only two or three Directors. As a shareholder in the Folkestone Gas Company he said at its meeting in London he had been the only independent shareholder present, whereas at meetings of that Company in Folkestone there were usually 12 or 18 such shareholders present.

Mr. Tooms said he had served as administrative Director of the Gas Department of the Oslo Corporation, and as Chief Engineer to the Primitiva Gas Company of Buenos Aires. He had no criticism to make of the South Eastern Gas Corporation *per se*, but in so far as he believed it was not subject to the restrictions commonly applied to statutory gas undertakings, except through the companies it controlled, the administration required very careful consideration.

Mr. Tooms suggested there had been already some extravagance at the expense of the revenue account in regard to changes made concerning the secretarial work of the Company, and also endeavoured to show that the sliding scale system was not 100% effective in its control, as might be assumed. For example, there was nothing to prevent the Gas Corporation charging a certain percentage on all the purchases which he understood they effected for the Deal Company. He also criticized items in the Company's accounts, and suggested that the claims as to savings effected in the last three or four years were not substantiated by the published accounts. It was conceivable that bulk supplies might be arranged between companies controlled by the Gas Corporation, on terms particularly advantageous to that Corporation, but perhaps to the prejudice of some consumers, even though the price of the bulk supply might be fair. It was suggested that in the absence of the clause whereby Directors could be interested in contracts made with the Companies, that could not happen.

Mr. RONCA pointed out that the clause in question dealt with the interests of individual Directors in contracts, whereas the case suggested was one involving two Boards, even though they might be constituted of the same men.

Mr. *Tooms* said it must be taken into consideration that these Directors were acting as nominees of the governing concern, which was not controlled by the Board of Trade.

Mr. ASKEW, in his closing address, emphasized that the opposition had been on the basis that no attack was made on the administration of the Company, or, for that matter of the Gas Corporation. Therefore, he ignored the criticisms Mr. Tooms had attempted to make in that regard. The real case which the objectors had attempted to make was that the Directors of the Company, or of any Company, might, by doing something improper, seek to use monies of the undertaking for the benefit of the shareholders of the Gas Corporation; but he pointed to the four safeguards in law and practice which had already been mentioned, and which operated to prevent that possibility. He asked that the Board of Trade would approve the Order in the form in which the Company desired it.

The enquiry was concluded, and the Board of Trade will consider the evidence.

MANCHESTER AND DISTRICT JUNIOR ASSOCIATION

THE PRESIDENT,
Mr. A. K. COLLINGE.

Mr. A. K. Collinge was educated at the Preston Grammar School and the Preston College of Technology. He served a pupilship of three years' duration under Mr. Samuel Tagg, during which time he gained the Honours Grade Certificates in Gas Engineering and Gas Supply of the City and Guilds of London Institute, being awarded the Bronze Medal in Gas Supply. In 1921 he was appointed Chief Chemist at the works of the Preston Gas Company, and later became Assistant Works Superintendent. In this capacity he was closely associated with Dr. M. W. Travers, F.R.S., in the development of the Travers-Clarke complete gasification system, an experimental plant of 500,000 cu.ft. per day being erected at Preston under his supervision. In 1931 he was appointed to his present position of Works Superintendent of the Preston Gas Company's new works at Lostock Hall

Presidential Address

OF

A. K. COLLINGE

(of the Preston Gas Company)

Read at the Opening Meeting of the Association held at Preston on Saturday, Oct 5.

During recent years the attention of the Gas Industry has been focussed, as the result of keen competition, upon the various methods of charging for gas. As a result of this, and by taking advantage of the Gas Undertakings Act (1934), we have a number of methods of charging, each with its earnest advocates; flexibility in this respect is a weapon in our hands which is too powerful to be disregarded. It is not necessary, however, nor is it desirable, for us to evolve elaborate scales of charges similar to those by which electricity is sold, chiefly owing to the wide difference between the relative costs of manufacture and distribution and capital charges of the two industries. In Preston, in common with most other places, there are no less than thirteen different scales in operation for selling current, apart from special quotations—a state of affairs which was deplored by the Electricity Commissioners in their report for 1934.

The introduction of new forms of tariffs for gas is as necessary to-day as was the system of charging by the therm 15 years ago; but although methods must necessarily vary throughout the country there should be agreement as to the unit; and it may be to our best interests to discard the therm as a selling unit in the not too distant future.

Electrical Competition.

For many purposes gas has a number of practical advantages, such as reliability and ease of control, but we cannot expect these advantages to remain with us always. We may rest assured that the electrical industry will never rest until such problems as these have been overcome, and they are, indeed, in process of being overcome. Also, the wide use of electricity for lighting, with a two-part tariff, tends to make the consumer assess the cost of the current he uses for other purposes at the commodity rate alone. With this assumption, our selling policy in Preston is to get points for gas installed in new houses and to convince the tenant that he will receive better value from us than he can obtain from electricity at the commodity rate of ½d. per unit. The chief asset of the Gas Industry—and before very long it will be the sole one—is cheapness, and during the course of my Address I hope to review a few of the means by which we, as technicians employed in production, can assist in the reduction of the cost into holder.

In order to meet the increasing competition from electricity at Preston and to obtain correct records to form the basis of sales campaigns, a census scheme was commenced in 1929. This was completed in a little over two years, during which time 46,479 calls were made. The number of appliances sold by the census staff, as distinct from ordinary sales, totalled 2,825, the profit from which more than paid for the cost of the scheme by £297. The success of the sales and canvass campaign which followed the census is indicated by the following record of appliances sold, mainly on the hire-purchase system:

—	1927.	1929.	1934.
Cookers	1,103	1,912	1,938
Boilers	793	791	738
Fires and radiators	347	884	591
Hot water appliances	11	36	1,269
Totals.	2,254	3,623	4,536

A determined effort to secure the hot water load was commenced in 1932, and over 4,000 "K.C.U." water heaters have been sold up to the present. Maintenance schemes, showroom displays, advertising, cookery lectures, and exhibitions all play their part in a persistent effort to retain and expand the domestic load. The attention which is given to new properties is indicated by the fact that during last year 3,791 gas points were installed in 753 houses erected in the Company's area. An Industrial Sales Section has been in operation for over two years, and considerable success has been achieved in the light engineering industry, brewing, biscuit making, artificial silk treatment, and many small and varied industrial processes.

The widespread loss in the lighting load and the sales of water heaters have transferred a portion of the winter load to the summer months and this tendency is evidenced by the following consumption figures for Preston:

—	Summer 6 Months.	Winter 6 Months.	Total.
1928	422	624	1,046 million cu ft.
1933	450	594	1,044 " "

Fields for Expansion.

When it is considered that modern gas appliances, particularly cookers and fires, consume very much less gas than was the case several years ago, any undertaking which can retain its domestic load can be said to be in a fairly satisfactory position. But there is some truth in the saying that there is no standing still—we either go forward or backwards; consolidation of our position is not sufficient; and in the attempt to advance a great deal of attention has been directed to the use of gas in industry. Many undertakings have gained considerable loads by selling gas for industrial use at low prices, special quotations being

made after considering the important factors of period and seasonal demand. But the low prices which have to be quoted for gas in order to meet competition, particularly from oil, reduce the value of these loads and tend to restrict large increases to those Undertakings which have cheap supplies of coke oven gas available or which are greatly assisted by particular local circumstances in the production of cheap gas.

Throughout the country as a whole, it can be said that the domestic market is the most valuable one, since it is not so dependent upon the conditions of trade, and it is a field in which gas can be sold at a reasonable price and still meet competition. We must remember that 70% of the gas sold in this country is used in the home. For that reason it has been stated that the Gas Industry is a woman's industry; and our propaganda has been directed to make special appeal to the housewife.

In searching for further means of increasing the domestic use of gas let us bear in mind the increasing desire of the community for cleanliness and convenience and the awakening of the public conscience to the evils of atmospheric pollution, over 75% of which is due to domestic smoke. In spite of differences in cost gas is already making considerable progress for the central heating of large buildings, and such a scheme could well be applied to the better class house, supplemented by gas fires. There are already considerable numbers of workmen's flats in existence where gas is installed for all cooking and heating purposes and in some cases for lighting as well. The Minister of Health, in moving the second reading of the Housing Bill in January last assured the House of Commons that the programme of re-housing 1¼ million people in five years would be fulfilled, and in many cases flats were the only means of economically using central sites. The working classes have been very good friends of the Gas Industry in the past, and we must not allow that association to be broken.

Average Manufacturing Costs.

Having briefly reviewed the market for our chief product, let us consider the various means which lie within the scope of the works' engineer to effect a reduction in manufacturing costs. The cost into holder is usually less than half the selling price of the gas and in the following table is given the main items of the average cost into holder of 44 Companies for the year 1934:

Item.	Pence per Therm.	% of Total.
Coal and oil—		
Gross	3·79	
Net	1·79	48
Purification	0·08	2
Salaries	0·17	4
Wages	0·49	13
Maintenance	1·23	33
Net cost into holder	3·75	

I quote these figures to indicate the relative importance of the various items which lie within the control of the works' engineer, and will proceed now to describe the methods adopted at Preston to reduce these items. A description of the works has already appeared in the Press (*vide* Paper by Mr. A. Langley to this Association, Nov. 5, 1932), but, in brief, the works produces 1,000 million cu.ft. of 480 B.Th.U. gas per annum by Drakes verticals, all subsidiary plant being driven by electric power generated by steam from waste-heat boilers.

Selection of Coals.

The net price of coal is, of course, the most important item, and is controlled by the cost of coal per ton, the selling price and yields of coke and tar, and the make of gas per ton.

Before coal contracts can be made, and also during their fulfilment, it is essential to carry out proximate analyses, and in this connection too much attention cannot be paid to careful sampling. It has been the writer's experience that good initial sampling is often spoilt by powdering a final sample which is too small. At Preston the final sample of 2 lb. is ground in a ball mill until the whole of it will pass an 80-mesh sieve. Since this practice was introduced laboratory tests have proved much more reliable and have shown much less variation. On particular occasions a descent of the pit has been made and samples taken from the coal face. Investigations have been made into the distribution of ash, volatile matter, and sulphur throughout the depth of the seam with a view to effecting an improvement in the quality of the coal purchased. These have shown that the ash and sulphur contents were highest in the upper part of the seams. In one seam of gas coal 3 ft. 4 in. thick the ash and sulphur contents in the top 12 in. were found to be 17·3% and 7·1% respectively, while throughout the remainder of the seam the amount of ash was 2·3% and sulphur 0·9%.

Considerable attention is paid to the percentage of chloride in the coal, for we find that if it exceeds 0·25% (calculated as Cl) troublesome deposits of ammonium chloride and pitch are formed in the hydraulics and collecting mains. A high chloride content is also known to have a very deleterious effect upon silica. It was found that the percentage of chloride varied considerably between different workings of the same pit, and in a number of cases it has been sufficiently high to cause an alteration in contracts.

A factor of great importance in the production of a high thermal yield is the size of the coal. The size which gives the best results is not necessarily the same with different classes of coals as it depends upon the caking properties, but in general washed singles are most satisfactory with the Preston plant. It is our experience that uniformity of size is essential for regular working. If mixed sizes of nuts are elevated, the mechanical separation which takes place in the bunkers is sufficient to cause wide variations in the calorific value of the gas made, a fall of as much as 20 B.Th.U. being known when the large nuts reach the retorts.

Many methods have been devised for the valuation of coals, and attempts made to reproduce in the laboratory the conditions met with in the retort house. Owing to such factors as swelling properties and re-activity to steam these methods are of greater value when the carbonizing plant consists of horizontals than verticals. In the latter case they serve as a useful guide in the selection of coal, but the ultimate choice is usually made by means of an actual test on the plant itself. On some large works one or two retorts can be isolated and used as a test plant, but as this involves the installation of separate auxiliary plant it can prove very costly.

In order to overcome this objection the following method has been adopted at Preston: Laboratory tests and quoted prices, together with references to published particulars of results from coals, indicate whether it is worth while making an extended test on a working scale. For this purpose about 300 tons of coal are required to enable one bed of 8 retorts to be continuously operated for a period of ten days. A small electric-driven compressor in the retort house draws a constant stream of gas from this bed and supplies it to the laboratory. Here it is tested on a recording calorimeter and 24-hour samples are taken in a small holder, tested for calorific value and impurities, and analyzed. The coal carbonized is tested daily, samples being carefully obtained from the conveyor, and screening tests are made to determine its size. The coke is sampled and tested, and is also supplied to a producer where full data of its performance is obtained. The exact weight of coal carbonized is, of course, known, and the weight of coke is estimated by tipping several skips each day into a motor wagon and obtaining an average weight per skip.

Trials such as this are carried out on 25% of the plant at times of low summer production. The coal used in the remainder of the plant is one in regular use with a known thermal yield; and as this only varies slightly from week to week the results obtained from the test coal can be deduced fairly closely. Tests conducted in this manner have been considered to be sufficiently reliable for the placing of contracts and have been in close agreement with subsequent results.

Weekly carbonizing results are obtained very exactly, all bunkers being completely filled at a fixed time on the same day every week. The daily make of gas is corrected for the pressure at the station meter as well as for barometric pressure and average temperature. The latter is obtained from the recording thermometer of the Connersville meter, which is periodically checked by a certificated thermometer. The average calorific value is obtained from the Sigma recorder on the inlet of the station meter, which is checked by a Boys calorimeter at least four times during each 24 hours.

It is the practice of some undertakings to purchase many different varieties of coal, in which case the method of testing which has been described could not, of course, be applied. At Preston, however, we find it most economical to confine ourselves to coal from two or three pits. The whole works can then be operated under very regular conditions. One of the many advantages accruing from this is that each producer can always be supplied with the same type of coke. This has resulted in improved producer gas, and owing to steady fuel-bed resistances the damper alterations on the settings are greatly reduced. The difference in fuel-bed resistance between the coke from two of our regular coals is sufficient to upset entirely the setting temperatures and greatly increase the fuel consumption; and unless uniform supplies of coke are available

constant adjustments in the control of the settings are required to maintain the desired temperatures.

The effect of making fresh coal contracts following tests made upon the plant itself in the manner described is shown by the carbonizing results of 1934 which were as follow:

—	January–June.	July–December.
Gas made (N.T.P.)	543,059,000 cu.ft.	524,102,000 cu.ft.
Calorific value	481·0 B.Th.U.	481·2 B.Th.U.
Coal carbonized	31,340 tons	28,766 tons
Make per ton	17,330 cu.ft.	18,220 cu.ft.
Therms per ton	83·4	87·7
Coal—		
Screened coal	87%	57%
Washed nuts	13 ,,	43 ,,

These results were achieved without paying a higher price for the coal and represent a saving of 3,000 tons of coal per annum, or £1,575 at a net cost of 10s. 6d. per ton. There were also savings in other directions, such as a reduction in the amount of coke sold at a price below the average, an improved quality of coke, and a reduction in the sulphuretted hydrogen in the crude gas from 545 to 463 grains per 100 cu.ft. (15%).

Carbonizing Control.

It will be realized that to maintain a yield of 88 therms of 480 B.Th.U. gas, which is our regular production, it is necessary to maintain the whole plant in perfect condition and to exercise the strictest supervision. With the object of arriving at the most economical working conditions, every part of the plant from retort to gasholder has been subjected to rigorous and sometimes protracted tests. The main points which are carefully controlled in the retort house by the shift superintendent in addition to general supervision are as follows:

(1) Control of the calorific value by extractor engine speeds and steaming (not by the retort house governor) to as near the declared value of 480 as possible. Each B.Th.U. above this figure costs the Company £125 per annum.
(2) Regulation of setting temperatures which are taken every 12 hours. The best temperature gradient for each type of coal is obtained by trials and is closely adhered to. The electric compressor to which reference has been made can be made to draw gas from any bed or any individual retort for testing varying conditions, and full use is made of these facilities.
(3) Regulation of main chimney damper and waste-heat boiler dampers, so that practically no fuel is used on the Lancashire boilers, which are purely stand-by.

While discussing therms per ton it is well to mention the importance of keeping down the inerts. We have made experiments with the object of removing the CO_2 from the gas by washing with sodium carbonate solution, which would allow us to increase our yield by 6 therms per ton by additional steaming. A plant was designed and erected at our old works which thus dealt with 20,000 cu.ft. of gas per hour, but the data obtained did not warrant the large-scale adoption of the scheme. There appear to be possibilities in the idea if the solvent triethanomaline (known commercially as Girbotol) could be purchased at a reasonable price or a satisfactory substitute discovered.

A further important item affecting the net price of coal is the fuel used on producers. Among the many points which are controlled under this heading I would emphasize the following:

(1) The fires are regularly cleaned but never more often than necessary. They are pricked at 8-hour intervals but only thoroughly cleaned every 48 hours.
(2) The quality of the producer gas has been improved by reducing the effective grate area from 25 to 20 sq.ft. per bed (each bed carbonizes 32 tons of coal per day). This has been done by means of a false plate inserted over the fire-bars.
(3) The reserve gas-making plant is kept at a minimum compatible with safety. The fuel cost of maintaining a bed under gaseous fire is £20 per week.

Maintenance.

The next item in order of cost into holder is maintenance, which accounts for about 33% of the total. It is only possible within the scope of this Paper to mention the most important points, which are as follows:

(1) All repairs and all painting with the exception of one gasholder are carried out by our own men.
(2) The efficiency of all stores and replacements issued is carefully recorded. Wherever it is desirable materials of all descriptions from retorts to soap are tested in the laboratory. In addition to the usual chemical and physical tests, examination by a high-power microscope is carried out.
(3) The re-setting of retorts accounts for a charge of about 0·05d. per therm, and the principal means which we adopt for keeping down this item can be summarized thus:

(*a*) The settings are kept in operation as long as possible without letting down. As the whole of the gas made at Preston is produced in the vertical retorts, the variation in consumption between summer and winter limits this time to two years, which is the usual period.
(*b*) The heating up of settings from cold is regulated by the use of a graph which is drawn from the expansion curve of the silica and which shows the daily temperature rise necessary to give the same daily expansion. Mercury in steel thermometers reading to 550° C. are used and a standard procedure is carried out. It is important to supply cold coke to one side only of the producer at once while under slow fire, as otherwise the temperature of the heating gases falls 150° C. in a few minutes. By careful stoking this has been reduced to 30° C.
(*c*) After scurfing the retorts, which takes place at intervals of five weeks, leaking joints are made tight by means of a "G.B." gun. After many trials we have found a patching material which is quite satisfactory, and it is very rarely that a joint which has been shot shows any leakage at subsequent scurfing periods. The average number of shots per retort after each scurfing in the year ended June 30, 1935, was six.
(*d*) We tried various materials which were on the market for applying a new lining to retorts by application as a plaster when cold, but without exception they were failures. After experiments extending over twelve months we succeeded in producing a mixture which is a partial success. It is applied to a thickness of about $\frac{1}{2}$ in. and sets hard when cold. After burning it is exceedingly hard and its surface will not spall. Its adherence to the retort depends upon the roughness of the surface, the extent to which it is forced into open joints and its structural strength; for the latter reason it will not prove a success if applied to flat sided retorts. Apart from this use the material has been found to be very successful when used for cold caulking. It is not possible to state as yet the extent by which the life of the retorts is lengthened by the application of a new lining, but it is known that it will be very considerable.

The item of wages, which accounts for 0·5d. per therm or 12% of the cost into holder, is one which conveys little real meaning owing to the widely differing circumstances and methods of costing between different undertakings.

Purification.

The average cost of purification during 1934 of the 44 Companies is 0·08d. per therm or 2% of the cost into holder. The purifiers at Preston are at ground level and are not roofed over, and from researches into their working the following conclusions were arrived at:

(1) It is not desirable to exceed a gas temperature of 100° F.
(2) Owing to the low specific heat of gas, enclosed heaters placed on the inlet main or even on the inlet of each box are of little use.
(3) Steam heaters beneath the balcony plates are very inefficient owing to the heat losses from the lids.
(4) A study of the reaction heats makes it very evident that the heat losses should be reduced instead of attempting to add a large amount of heat. Consequent upon this conclusion we insulated the underside of the covers with 1-in. boards and two layers of $\frac{5}{8}$-in. felt. The total cost for the four boxes, each 60 ft. by 40 ft. by 6 ft. deep and the catch box 30 ft. by 40 ft. by 6 ft., was £320 or 9·9d. per sq.ft. of cover. This has been a complete success, and when additional heat is required in very cold weather live steam can be admitted to the inlet of each box.

Since the insulating of the covers in 1934 one parcel of 270 tons of oxide has been sold, and this contained 60% of sulphur, 5% of moisture, and 1·8% of tar.

In May, 1935, a tar fog extractor was installed at the purifier inlet consisting of a cast-iron box about 4 ft. cube packed with wood wool. The box throws 1 in. of pressure and reduces the tar fog from 10 to 2 grains per 100 cu.ft.

Manufacturing Costs at Preston.

In the following table is shown the analysis of the cost of manufacture at the Lostock Hall Works for the half-year ended June 30, 1935:

	£	Pence per 1,000 Cu.Ft. of Gas Sold.	Pence per Therm.
Coal	30,899	15·21	3·17
Less receipts from residuals	15,938	7·84	1·63
Net cost of coal	14,961	7·37	1·54
Purification	180	0·09	0·02
Salaries	1,776	0·87	0·18
Wages	3,927	1·93	0·40
Repairs and maintenance of plant	6,494	3·20	0·67
Net cost into holder	27,338	13·46	2·81

Coke Quenching.

Among many improvements which have been effected in the operation of the works is the introduction of a method of coke quenching which may prove of general interest. With the production of 480 B.Th.U. gas in vertical retorts it is necessary to add water to the coke to ensure freedom from fires and to reduce dust. The usual methods of external quenching result in a very uneven moisture content in the coke and with some systems considerable wastage of water. After many experiments on an individual retort we fitted a water spray immediately beneath each extractor, which injects a fine mist intermittently into the coke chamber. The water is turned on automatically for four seconds every two minutes by means of a device which we designed operated by the main extractor drive, each bed being separately controlled. When the coke is discharged practically no dust rises, it contains less than 1% of moisture, and will not fire. More water can be added on the screens, it being generally accepted that 3%-4% is desirable, but each size of coke should be sprayed separately through calibrated jets. Slightly less steam is admitted to the retorts in the ordinary way, and there is no increase in the CO_2 content of the gas. Dry coke can be supplied to the producers, which is a considerable advantage, and no water can be wasted. There is a great reduction in the amount of dust in the retort house and the working conditions of the "bottom men" are very much improved.

Future Possibilities.

For the concluding portion of my address I would like to view the future possibilities of gas production without attempting in any way to be prophetical. In my opinion the future development of production is in the hands of the chemist and physicist, and it lies in the better utilization of the hydrocarbons. The past history of carbonization makes it very evident that the engineer has made progress in advance of the chemist. From the very inception of vertical retorts attempts were made to increase their cracking efficiency, and it was known as long ago as 1911 that a space of 4 ft. of heated retort above the coal charge increased the calorific value of the gas. Experiments along these lines are still being carried out—we have made quite a number at Preston—but it is evident to me that far more control over cracking is necessary than is possible in the retort itself.

To achieve success the temperature should be controlled within narrow limits, and such factors as time contact and extent of heated surface must be regulated. One has only to calculate the gaseous thermal yield which would be obtained from a ton of coal if all the hydrogen—without addition—were converted into acetylene to realize the effect of even a small success in this direction.

I would suggest that the solution of the problem lies in the regulation of the temperature gradient to prevent overcracking as far as possible, the fractional condensation of the tar, and the gasifying of the light tar in a separate cracking plant. The production of gaseous hydrocarbons would then be under absolute control instead of being largely a matter of chance as at present. Attention has been directed to the hydrogenation of light tars, but from the results obtained by the Fuel Research Board and also from the large-scale operations conducted by Imperial Chemical Industries it would appear that small units are impracticable.

The adoption of a separate cracking plant is largely a matter of local economics, for we cannot expect to effect any marked increase in the already high total thermal efficiency of the process of carbonization. The decisive factors are the prices obtained for tar and coke and the declared calorific value.

From published results of the use of vertical retort tar in water gas and experimental cracking plants it is apparent that for every gallon of tar cracked 7 lb. of coke will be used in the retorts and producers for extra steaming to yield a mixed gas of 480 B.Th.U.; 1·6 therms would be produced, together with ¾ gallon of good quality residual tar and a small quantity of benzole and coke. The cost of cracking the tar should not be excessive, so that it is possible to form an estimate of the cost of the added gas from local prices. From current markets and prices of tar and coke it would appear that the scheme merits further investigation.

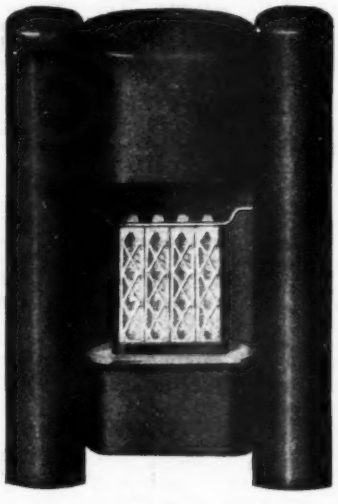
Gas Fires for the Modern Home

New Season's List of Stoves, Ltd.

The comprehensive range of gas fires listed in the 1935-36 catalogue of Stoves, Ltd., Rainhill, Liverpool, has been compiled to meet the requirements of the modern home.

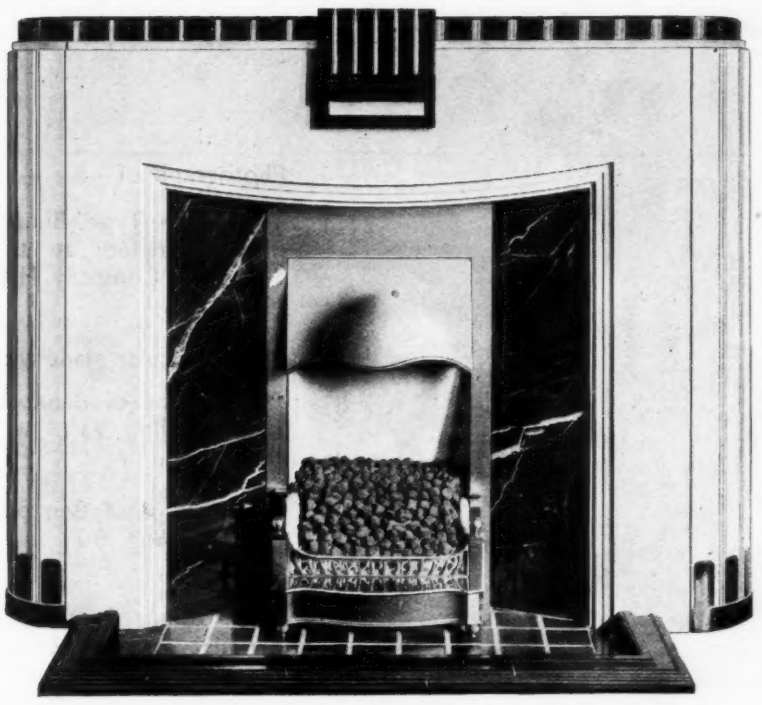
Adequate choice of design, finish, and size has been carefully considered and provided. There are styles to suit different rooms and colours to harmonize with the various types of tiled or metal fire-place surrounds. Since successfully introducing the "Silo-Matchless" fires last season, certain small but important improvements have been incorporated in the design. The mesh in the front of the radiants has been enlarged with a corresponding increase in efficiency. The depth of the frame has been reduced to improve the proportions and with these modifications Stoves, Ltd., feel sure that the "Silo-Matchless" with ignition device embodied will prove an outstanding attraction during the coming season.

We reproduce here a photograph of the "Rayflex" portable screen reflector heater which incorporates a copper reflector specially arranged to give a wide angle of reflected heat which combined with the radiant heat gives cheerful glowing warmth and comfort. Constructed of heavy-gauge stamped steel with cast-iron burner fitted with gas and air adjuster, control tap, and flexible tube nozzle. This model may be had in three finishes: brown, green, and putty. An inexpensive and useful range of portable fires are listed, and in addition to the "Rayflex" the "Improved Ravec" is worthy of special mention. This heater combines radiant and convected heat and can be used with safety and comfort in small rooms. The "Convex," "Portal," and "Simplon" fires should assist in developing gas sales, as they have been specially designed to cater for an existing demand for fires which are attractive in appearance but reasonable in price. The "Supervector" panel heater, following the success of the



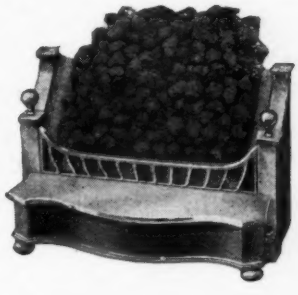
first model, and in response to numerous enquiries, has been produced in a smaller and a larger size. The scope of this series is now increased considerably and covers the heating requirements of almost any type of building.

TALKS ON HEATING APPARATUS



"IT is extraordinary that some people are so slow in making a decision when they believe they are likely to experience some inconvenience in making that decision. But persuade them that they will suffer no inconvenience, and they respond almost immediately.

The CINDERELLA Fire provides an instance where the consumer will be definitely encouraged to instal gas fire heating. The simplicity of fitting this fire, its cheery appearance in use and resemblance to glowing coke, provide persuasive powers to convert the consumer."



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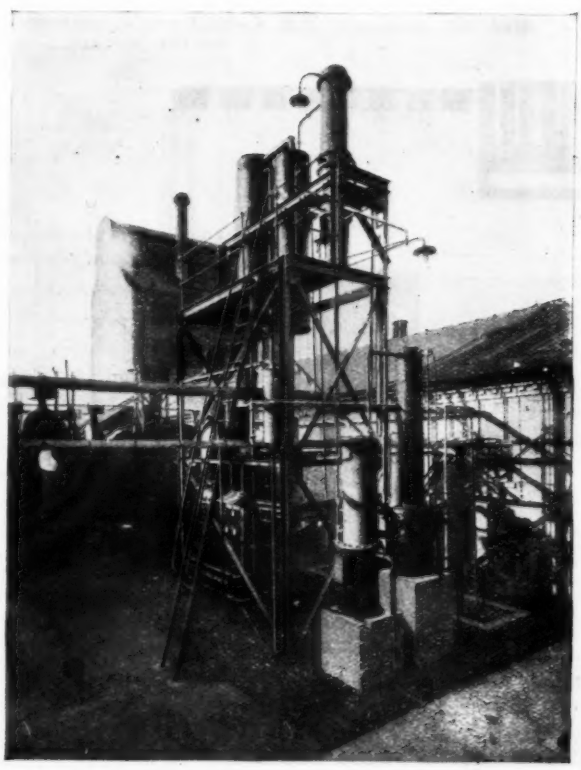

Photograph of

Thorncliffe Type Benzole Recovery Plant installed at the Hampton Court Gas Company, Hampton Wick, Middlesex.

This particular plant will produce:—

1·85 gallons of Benzole per ton of coal distilling 93% at 120 degrees centigrade, or

2·25 gallons of Benzole per ton of coal distilling 80% at 120 degrees centigrade.

Any required variation in the product obtained by simple thumb screw adjustment.

The Thorncliffe type Benzole Plant specially constructed to meet the modern requirements of undertakings of varying sizes has the following outstanding advantages :—

1. Low Capital cost.
2. Existing Gas Washers can be adapted.
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4. Small ground space required.
5. Any quality of Benzole guaranteed from 70% to 95% at 120 degrees centigrade.
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THE PRESIDENT.

Mr. Arthur J. Doran has been associated with the Chemical Staff of the Edinburgh Corporation Gas Department for the past 26 years. He has been lecturer in Gas Engineering at the Heriot-Watt College, Edinburgh, since 1925, and has been keenly interested in The Institution of Gas Engineers' Education Scheme. He has been representative of the Scottish Junior Gas Association (Eastern District) on the Scottish District Education Committee for the past four years.

Presidential Address

OF

A. J. DORAN

(of the Edinburgh Corporation Gas Department)

Read at the Opening Meeting of the Association, held at Dunfermline on Oct. 5.

The Chemical Staff in the Gas Industry is largely recruited from Universities and Technical Colleges. It is not true, as is sometimes alleged, that these institutions exist for merely satisfying a "thirst for knowledge;" on the contrary they aim at qualifying men to take their place in industry. The aim is essentially practical and not theoretical. The manufacture of gas is undoubtedly a chemical one, and the technical control of the process is largely in the hands of the chemist, yet it is a general fact that the prospects of the chemist ever attaining administrative or research status are extremely meagre.

Let me now deal with the general work of the chemist. First, I will deal with coal, a substance about the complexity of which we know very little. Too often has coal been purchased on the sole consideration of price, no investigations or calculations being made as to whether in local circumstances the cheapest coal is most economical in the long run. The choice and selection of a coal is one of vital importance. Coal contracts are usually entered into annually based on the valuation of chemical analysis, semi large scale carbonization, and full scale carbonization results. Taking the first mentioned—namely, chemical analysis—this mainly confines itself to the determination of the chemical elements contained in the coal and the percentage of each, such being known as the ultimate analysis, or it may be the simple determination of the moisture, volatile matter, fixed carbon and ash, known as the proximate analysis. I do not wish to infer that such analyses are a true guide to the selection of a coal for gas making purposes, but a knowledge of the percentage of oxygen, moisture, sulphur, and ash is valuable. Volatile matter is not a reliable indication as to the gas-making properties. The character of the ash is important as it affects the quality of the coke, also its behaviour as clinker; sulphur may seriously affect purification costs, while O_2 shows itself as water and CO_2, &c., which are disadvantageous. The only reliable method of testing coals and judging their suitability is to carbonize them in the Gray King assay apparatus or semi or large scale carbonizing plant and such work usually falls to the chemist. Each type of coal has its own peculiarities, and these can only be discovered by test plant investigation.

In Works like Granton where the annual consumption of coal is in the region of a quarter of a million tons the need for regular examinations of the various coals used will at once be apparent When coals are selected after satisfying the various factors which govern their selection, and contracts entered into, it is necessary to examine them at regular intervals to see that the quality is maintained. A reduction in quality where thousands of tons are involved, would, if not detected involve the undertaking in serious financial loss, thus the chemist by his vigilance in this work may be the means of preventing any such loss. Having thus decided on a system which ensures a regular supply of coals, it now follows that similar control should govern its subsequent utilization.

Maintenance of Retort Temperatures.

The importance of the maintenance of correct retort temperatures requires no stressing and the retort house chemist finds that his job is centred around this. Since the design of the setting and the choice of coal to be carbonized have been already determined the pursuit of efficiency lies in the correct utilization of the plant at his disposal. Hence the starting point is to be found in the production of an ample supply of suitable producer gas, and the chemist is relied upon to see that the producers are worked in the best possible manner. He obviously has to strike a balance between the manufacture of a good producer gas and the accompanying tendency for clinker formation, and a solution has to be arrived at for each set of local conditions.

Having obtained the required producer gas, its proper use in the setting is of paramount importance, and it may be mentioned here that a careful regulation of dust accumulations in the flues is not the least factor. The particular temperatures and heat zoning in the combustion chambers are usually fixed by the management as a result of previous experience, and the maintenance of these conditions with a minimum of variation is of vital importance both from the points of view of optimum working conditions and plant wear and tear. It is plain that the refractories in use to-day have been chosen mainly for their heat-resisting properties and do not unfortunately possess outstanding mechanical strength. Hence the importance of heats which are both even across the retort major axes and uniformly zoned vertically becomes evident to minimize disruptive forces within the brickwork. This becomes very prominent when the attainment and maintenance of correct scurfing temperatures is considered.

This problem of retort life is undoubtedly largely dependent on the treatment meted out when a bench is lit up from cold or let down. The careful regulation of the rate of heating up to conform to the alterations in the refractories due to the several well defined changes in crystal structure is a matter that cannot be lightly regarded and it is necessary that this work be under the supervision of one who, like the chemist, is fully aware of the primary importance of the job. The remarks apply with equal force to the problem attached to the damping out of retorts, where the treatment given must be such as

to allow all parts to settle down without damage or distortion.

The instruments designed for the control of the various units of the plant require to be under the supervision of a technically trained person in order that their records may be correctly interpreted and acted upon, and further that the instruments themselves may be maintained in good working condition. The effect of the various working conditions on the refractory has been mentioned and the regular examination of the retorts and flues with a view to detecting incipient failures is necessary. Thus the daily examination of combustion chamber temperatures gives opportunity for observation of coal gas or water gas leakage from the retorts, while a routine of retort inspection should be carried out at each scurfing period. By this means leakage, spalling, or any other structural failure is immediately detected and appropriate means taken to provide a remedy. The actual cement spraying or shooting is of course performed by skilled workmen, but the chemist has the responsibility of certifying the retort as correctly repaired and fit for further work.

In view of the fact that the work of the chemist brings him into contact with the whole of the retort house routine he is usually called upon to act in conjunction with the works superintendent in many ways. Thus the analysis of such factors as coal used, retort leakage, heats, or even the effectiveness of the retort house personnel may be called for with a view to explaining variable carbonizing efficiencies, or special reports for manufacturers on the behaviour of the various units may be required.

Supervision of C.W.G. Plant.

The supervision of the carburetted water gas plant again falls by choice to the retort house chemist, especially in view of the high efficiency demanded of the recent automatic plants. In this connection the chemist acts in an advisory capacity to the operating staff in connection with the maintenance of correct heats, calorific value, and other factors, and helps in the adjustment of the plant to cope with changes of fuel supplied or similar matters.

It may be stated that it falls to the lot of the retort house chemist to maintain contact with the representatives of the various manufacturers and to take over from them new and reconstructed plants, and also to assimilate new ideas in retort house practice and train men in their use.

As the manufacture of concentrated ammonia liquor in Edinburgh is comparatively new a few observations made here on the working of the plant at Granton may not be out of place. It is not necessary to describe the process as it has already appeared in the Technical Press, but mention of some of the modifications made may be of interest. The plant has been in operation now for close on two years and has on the whole been very satisfactory. At an early period trouble was experienced by the loss of ammonia passing off in the waste gases. The scrubber through which the waste gas is passed is a cylindrical vessel containing a perforated plate and filled with granite chips, water of course being the medium used for washing. This apparatus had the effect of exerting considerable back pressure on the concentrated liquor tank and in addition it was found impossible to remove all the ammonia. The amount of water necessary being so great that it had the effect of reducing the strength of the concentrated liquor produced as all washings ran to the concentrated storage tank. To counteract this trouble the contents of the scrubber were removed and a solid plate with a 6-in. hole and a 9-in. upstand inserted, and large pieces of limestone used in place of the granite chips. Raw ammoniacal liquor was substituted for water as a washing medium, the washings being run to the liquor feed tank. An additional scrubber was inserted previous to the oxide purifier for the purpose of preventing the formation of ammonium carbonate in the purifier, this keeping same in an active condition. These alterations have proved very beneficial and practically no loss of ammonia is now taking place.

Originally the excessive formation of ammonium carbonate caused the automatic cut-out of liquor every ten hours, and for a period of one hour (this being the time required for dissolving the carbonate) the atmosphere became so charged with ammonia that it was impossible to remain in the building without masks.

Steaming the Condensers.

Following the removal of the carbonate it was found that the automatic resumption of liquor did not take place, thus it was necessary to have the operator present to put the controls into proper working order. It has been found very beneficial to introduce steam into the condensers at regular intervals, as this has the effect of preventing the formation of carbonate and ensures a continuous run. I append a few figures in relation to the costs over a year's working:

Cost of Manufacture.

	Per Ton of Concentrated Liquor. s. d.
Total steam and condensation	6 6·35
Wages	3 2·05
Water	0 0·21
REPAIRS AND MAINTENANCE—	
Material	0 2·32
Wages	0 8·52
Carriage	4 8
Total	15 3·45
Concentrated liquor sold	3,020 tons
Average strength of liquor	17·8%

The cost of labour and steam may appear somewhat high, but owing to the isolated situation of the plant it is essential to have operators in continuous attendance. The possible introduction of a benzole plant in the same building would materially reduce such costs, as no doubt both plants would come under the control of the one operator. These figures also include the cost of the alterations and other experiments carried out and have of course added to the cost of production.

The claim of carbonizing industries is that the constituents of coal are recovered and used in their most valuable form, and in this connection it follows that benzole should be isolated, and not allowed to go forward in the gaseous product. This was fully realized in the war period when the need of munitions demanded that every available source be tapped. This valuable product has again come into prominence as a factor in minimizing our dependence upon foreign sources of liquid fuel. In the Gas Industry there is an increasing readiness to produce this product. The Edinburgh Corporation Gas Department decided to explore the potentialities of benzole production and the chemical staff was accordingly instructed to carry out a series of experiments with a view to obtaining the necessary data. The work was inaugurated by a laboratory determination of the benzole content of the gas. This was followed by the erection of a small scale oil washing plant, which, reproducing working conditions, permitted data concerning yield, quality, and the general effect of stripping of the gas to be ascertained. From the results of such tests the management are in a position to formulate a policy as to the adoption of the process.

Fundamental Problems.

Problems periodically arise in the ordinary course of work which require a certain amount of original investigation, which usually proves helpful, but the elucidation of fundamental problems is usually in the Gas Industry conducted by central organizations. At Edinburgh, however, we are fortunate in having in Mr. Jamieson, a chief who is always keen to investigate problems affecting the Industry at first hand. Under his supervision we are presently at Granton pursuing investigations into certain properties of coal, in conjunction with eminent authorities, including the Fuel Research Board; and the work allocated to us involves the study of the effect of weathering on various Scotch gas coals and also the observation of the behaviour of Scotch cannel coal, when subjected to various conditions of carbonization in continuous vertical retorts. These form part of an intensive scheme of research, from which results are expected, which will enable coal to be efficiently utilized in view of modern requirements. Such work is undoubtedly of the greatest importance, and demands that great care and accuracy must be the keynote.

The chemist by reason of his intimate knowledge of the actual manufacturing process is indisputably qualified to undertake posts of a more responsible nature than usually fall to his lot. In general, the chemist finds that the path to these higher positions is beset with many obstacles and the status and remuneration offered do not adequately recompense him for the arduous and expensive training undergone.

It would undoubtedly be an added stimulus to the chemical staffs, were the various organizations to offer recognition of the part played by them in the Industry, and I am pleased to note that this matter has received prominent mention recently in the Technical Press. While pressing for recognition for the chemist, I am equally desirous that all junior members of our Industry should be assisted in their endeavour to become qualified. Thus,

in bringing my Address to a conclusion I would like to appeal to the various undertakings in the area of our Technical Colleges to encourage their young men to avail themselves of the classes offered by these institutions.

Discussion.

Mr. SYDNEY SMITH (Bristol) thanked Mr. Doran for an Address of great value. He suggested that the "watchdog" days of the chemist were passing, and that he was being consulted by the management and board on vital matters in an increasing degree. In connection with coal contracts and analysis he suggested that percentages of moisture and ash should be fixed and the variations allowed for in the purchase price.

Mr. DORAN agreed that routine work had been regarded as the chemist's job, but that on larger works research work was being carried out and his highly technical training being more fully utilized.

Mr. J. M. DOW (Kirkcaldy) felt that it was necessary to be a chemical-engineer to be qualified for the profession. Regarding spraying of retorts when under heat where water was the medium used to carry the cement he felt that the blow holes made by the evaporation of the water were a contributory cause of spalling.

Mr. W. MASTERTON, B.Sc (Edinburgh), agreed with Mr. Smith's observation that the large gas-works gave every sympathy to ideas produced by their staffs, but it was not sufficient that the support be confined to the individual undertaking. The support of the Industry as a whole was also necessary, and this was lacking.

Mr. R. COWIE, Jnr. (Hawick), said he felt that in a small works the mechanical engineer was of more use than a chemist for the general work to be done and that the lead in new developments and plant was evolved by the larger undertakings, and so the services of a chemist were secondary to that of the engineer. He said they were interested in benzole recovery at Hawick as a means of increasing the load factor of the plant.

Mr. RICHMOND (Penicuik) referred to the increased make per ton during recent years, but thought that such statements should be accompanied by a note of the additional steam, &c., added to the coal during carbonization. He said that in the large outside industries the chemist was now becoming the man of business.

Mr. DORAN, in concluding the discussion, appealed to the members, and especially those in managerial positions, to give encouragement and assistance to the student members of their staffs. Where the response was not forthcoming for the classes arranged in the various colleges under the Education Scheme, it often meant the cancellation of these classes, and this caused a loss of time in completion of the prescribed courses.

Gas Undertakings' Results

Chelmsford.

The annual report of Mr. F. N. Howes, Engineer and Manager, on the working and progress of the Chelmsford Gas Undertaking for the year ended March 31, 1935, states that the year's trading has been a successful one and the Department continues to make good progress. From the annual balance-sheet submitted by the accountant it will be seen that the net profit for the year is £5,062, against £1,806 last year. The improved profit has been due to increased sales of gas, relative saving in manufacturing costs, reduction of loan charges, and refund of income-tax. The sale of apparatus has also been very satisfactory. During the year in question the price of gas has remained at 3s. 9d. per 1,000 cu.ft., or 10d. per therm, with the exception of Writtle and Sandon, where the price is 4s. per 1,000 cu.ft. (10·66d. per therm), all less the customary 2½% discount. Prices to large consumers are from 3s. 8d. to 3s. 1d. per 1,000 cu.ft. The total amount of gas sold, including public lighting, amounted to 233,321,000 cu.ft., an increase of 9,813,200 cu.ft., or 4·39% on the previous year. During the year 136 ordinary and 181 slot consumers have been added, making a total of 317. On March 31 the total consumers numbered 9,010. Despite keen electrical competition, there is an increase in the average consumption per consumer from 24,047 cu.ft. last year to 24,240 cu.ft. in the current year. A further improved make was obtained, the coal yielding 75·42 therms per ton, against 73·60 therms, only an additional 300 tons being required to produce the additional gas sold. The net income from coke increased by £127. Thirty-eight additional public lighting lamps were added during the year. The sale of appliances of all kinds continues to be highly satisfactory.

Taunton.

The report of the Directors of the Taunton Gas Light and Coke Company for the year ended June 30, 1935, states that the amount of gas sold during the past year has been 214,664,560 cu.ft. The amount available for dividend is £5,624, and the Directors propose a dividend for the year at the following rates: 5% on the 1897 preference stock, 7% on the 1920 redeemable preference stock, 9% on the consolidated "A" stock, 7½% on the yellow shares, and 7⅞% on the new (1897) ordinary stock. The dividends and interest will absorb £3,858 for the second instalment, payable Sept. 30, 1935, an interim dividend having been already paid.

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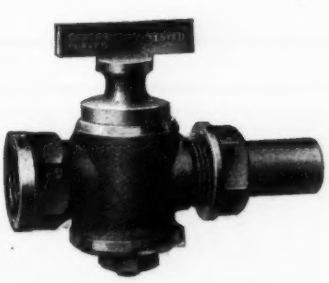

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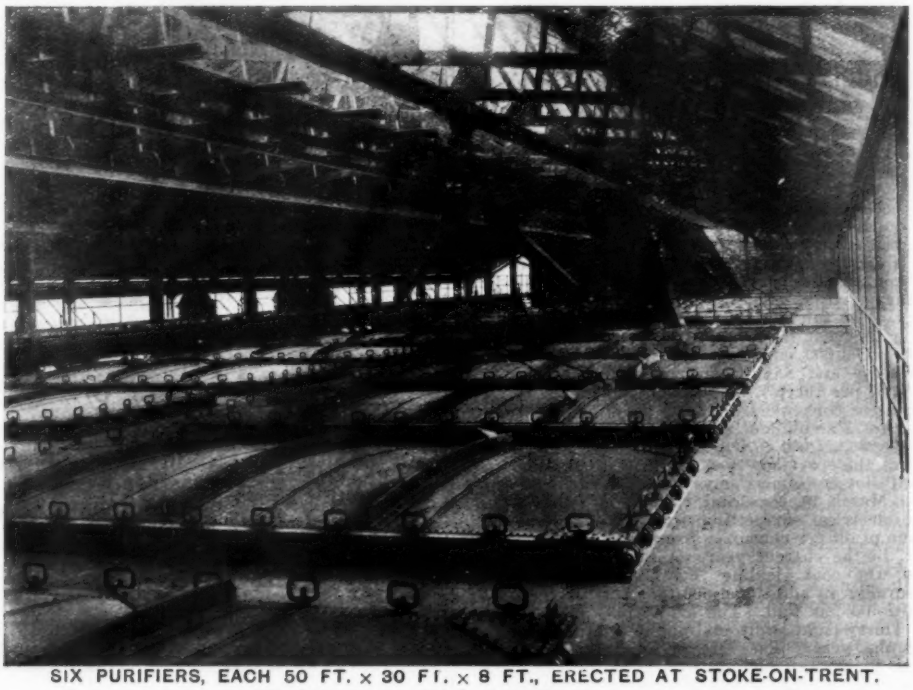

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Gas Markets and Manufactures

Stock Market Report

(For Stock and Share List, see later page)

Any fears as to the outcome of the international situation appeared to have been allayed last week, for the time at any rate, for when the new Account opened on Monday buyers were more in evidence, and active conditions were general in nearly all markets. Conditions remained comparatively cheerful throughout the week, and, despite some profit-taking at the close, prices of a large number of securities finished higher than a week ago. It remains to be seen to what extent the political events at home will affect markets, but if international affairs become more settled, the position at present appears strong enough to ward off any weakness usually accompanying a General Election.

There were no outstanding features in the Gas Market, which remained dull with business rather patchy. Values for the most part were maintained, however, and it is satisfactory to note that no further reactions occurred in the ordinary stocks of the Metropolitan Companies. Gas Light units were fairly well supported, and though the price began to harden towards the end of the week the quotation closed unchanged at 26s. 3d. Imperial Continental, on the other hand, more than recovered the previous set-back and rose 3½ points to 210½, while Wandsworth 5% preference was raised 1 to 123½. The only falls occurred in Newcastle units, which were quoted at a wider margin on the local Exchange, resulting in a drop of 6d. to 25s. 6d., and in a few debenture and preference stocks, which weakened a point each.

Current Sales of Gas Products

The London Market for Tar Products.

Oct. 14.

The market for tar products is steady, with considerable interest being displayed in tar spirits. Current prices are as follows:

Pitch, 32s. 6d. per ton f.o.b.

Creosote is firm at about 5¾d. per gallon.

Refined tar, 4d. per gallon in bulk at makers' works.

Pure toluole, 2s. 3d. to 2s. 4d.; pure benzole, 1s. 7d. to 1s. 8d.; 95/160 solvent naphtha, about 1s. 6d.; and 90/160 pyridine, about 4s. 6d. to 4s. 9d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Oct. 14.

The average prices of gas-works products during the week were: Gas-works tar, 17s. 6d. to 22s. 6d. Pitch—East Coast, 31s. to 33s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 31s. to 33s.* Toluole, naked, North, 1s. 11d. to 2s. Coal-tar crude naphtha, in bulk, North, 6¾d. to 7d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 5½d. Heavy naphtha, North, 11d. to 11½d. Creosote, *ex* works, in bulk, North, liquid and salty, 4¾d. to 5d.; low gravity, 4¾d. to 5d.; Scotland, 4¾d. to 4⅞d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid, 60's, 2s. to 2s. 2d. Naphthalene, £12 to £14. Salts, 65s. to 75s., bags included. Anthracene, "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Oct.* 12.

Enquiries are still numerous, although actual business is not too plentiful. Quotations, however, are well maintained.

Crude gas-works tar.—The actual value is 26s. to 28s. per ton *ex* works in bulk.

Pitch remains dull at 30s. per ton f.o.b. Glasgow for export, and 30s. per ton *ex* works in bulk for home trade.

Refined tar is not too active, but makers are maintaining value at about 2¾d. per gallon f.o.r. in buyers' packages.

Creosote oil.—There has been a little more enquiry during the week, particularly for forward delivery and prices are steady. B.E.S.A. Specification, 5⅛d. to 5⅜d. per gallon; low gravity, 5½d. to 5¾d. per gallon; and neutral oil, 5¼d. to 5½d. per gallon; all f.o.r. in bulk.

Cresylic acid is receiving more attention, but values are unchanged. Pale, 97/99%, 1s. 2d. to 1s. 3d. per gallon; dark, 97/99%, 1s. 1d. to 1s. 1½d. per gallon; and pale, 99/100%, 1s. 3½d. to 1s. 4½d. per gallon; all *ex* works naked.

Crude naphtha is only available in small quantities at 4½d. to 5d. per gallon f.o.r., according to quality and district.

Solvent naphtha.—90/160 grade is steady at 1s. 3½d. to 1s. 4d. per gallon, but heavy naphtha, 90/190, owing to scarcity, has been increased to 11½d. to 1s. per gallon.

Motor benzole.—Production is well looked after and value in this district is nominal at 1s. 3½d. to 1s. 4d. per gallon in bulk at makers' works.

Pyridines.—90/160 grade is 5s. 6d. to 6s. per gallon, and 90/140 grade 6s. to 6s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole	0	9½	to	0	10	per gallon at works
Motor "	1	3	"	1	3½	" " "
90% "	1	4	"	1	4½	" " "
Pure "	1	7½	"	1	8	" " "

Contracts Advertised To-Day

Pipes.

Coalville Gas Undertaking. [p. 212.]

Retort House, &c.

Coalville Gas Undertaking. [p. 212.]

Washer and Scrubber.

Stockport Gas Department. [p. 212.]

Trade Notes

"K-B" Air Heaters.

Messrs. James Keith & Blackman Co., Ltd., have just issued their "K-B" air heaters list and we are indebted to them for the receipt of a copy. These air heaters are manufactured in two distinct sizes, steel and copper gilled. The unit construction provides an almost unlimited variation in size and heating capacity.

Calor Gas Publicity.

Calor Gas (Distributing) Co., Ltd., announce that commencing with the issues of next week, Calor Gas will be extensively advertised in such papers as *The Farmer and Stockbreeder, Farmer's Weekly,* and the *Dairy Farmer,* which every week reach nearly a quarter of a million homes in rural communities where town gas is not available.

Spray Paint Equipment.

We have received a copy of the spray paint catalogue recently published by B.E.N. Patents, Ltd., Gorst Road, Park Royal, N.W. 10. An attempt has been made to get away from the ordinary stereotyped catalogue and the result is a very pleasing publication. The body of the catalogue is printed letterpress in two colours, and there are eight pages including the cover in gravure featuring their spray equipment in use.

Circular Chart Type Recorders.

The Drayton Regulator and Instrument Co., Ltd., West Drayton, Middlesex, have recently published a broadsheet illustrating the "Drayton" circular chart type recorders for temperature, pressure, and liquid levels. Accuracy within close limits is guaranteed for these instruments over the whole scale. Each instrument is individually built and calibrated, and a test certificate is supplied showing exact deviations from dead accuracy where this exists.

"Staveley Products."

A very well written booklet has just been published by the Staveley Coal and Iron Company, Ltd., of Chesterfield, and we are indebted to the Company for the receipt of a copy. The publication gives a short account of the interesting history of the Company since its formation over 230 years ago. This is followed with a description and illustrations of the works and the various processes employed in the manufacture of the well-known Staveley Sand Spun pipes.

Lighting, Heating, and Cooking Appliances.

A copy of the catalogue describing the new autumn range of gas lighting, heating, and cooking appliances issued by Lighting Trades, Ltd., and The Welsbach Light Co., Ltd., has been forwarded to us by the Press Bureau of Imperial Chemical Industries, Ltd. This deals very thoroughly with a large variety of appliances and public lighting equipment. The indoor lighting fittings strike a very modern note and should find great favour among exponents of gas lighting.

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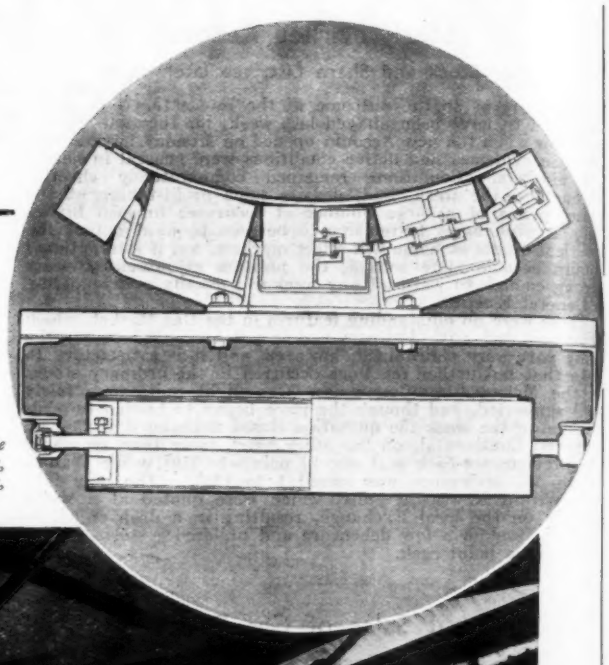

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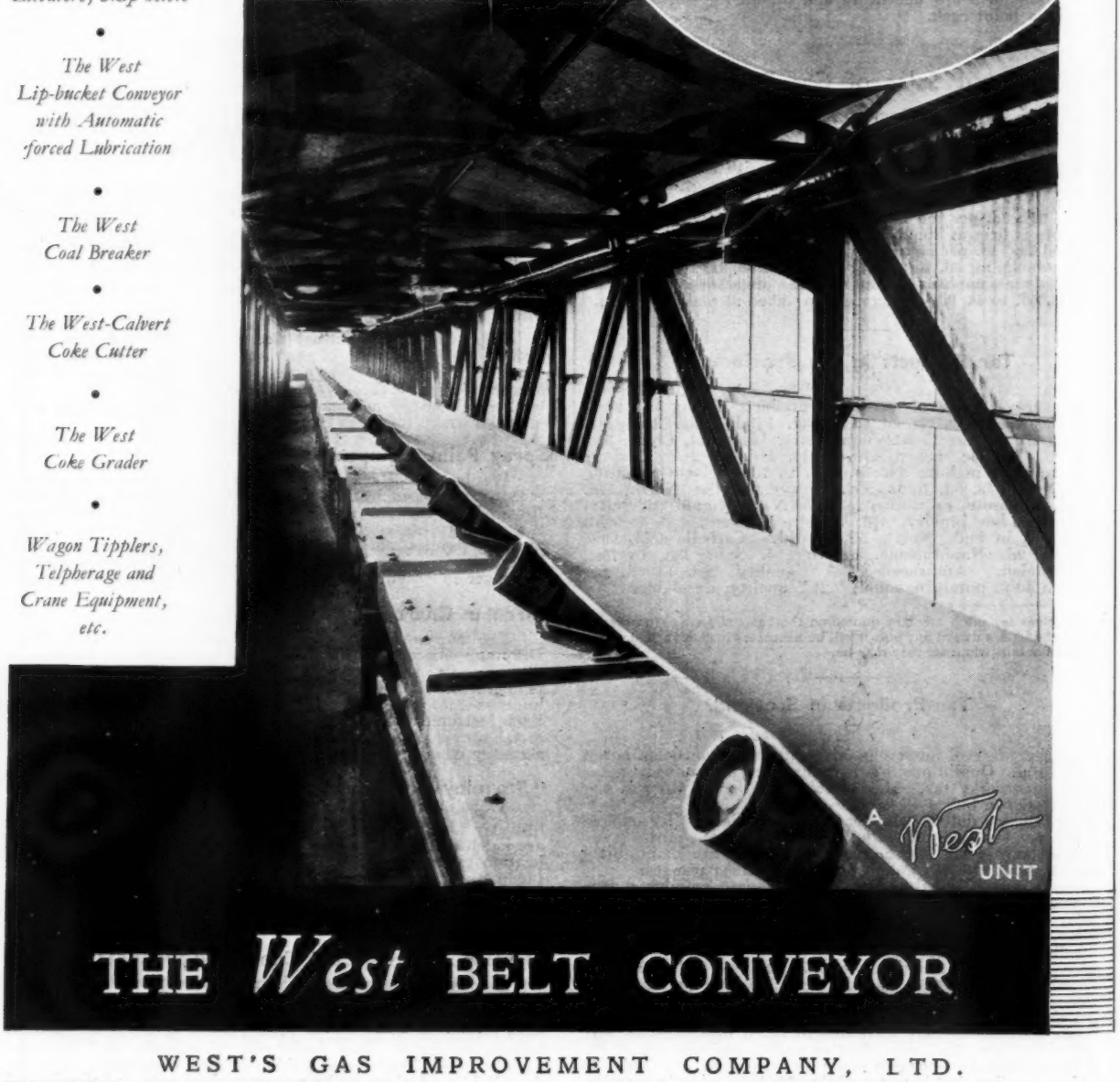

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Official Quotations on the London and Provincial Stock Exchanges

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1,551,868	Stk.	Sept. 9	7	7	Alliance & Dublin Ord. ...	130—140	...	135⅞
374,000	,,	June 24	4	4	Do. 4 p.c. Deb. ...	97—102	...	99
557,655	,,	Aug. 12	7	7	Barnet Ord. 7 p.c.	165—170	...	...
300,000	1	Apl. 8	1/4⅛	1/9⅜	Bombay, Ltd.	1⅛—1⅜	...	...
178,480	Stk.	Aug. 12	9½	9½	Bournemouth sliding scale ...	222—232	...	...
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	168—173	...	172—173
489,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	147—152	...	...
50,000	,,	June 24	3	3	Do. 3 p.c. Deb. ...	85—90	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	106—111	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
357,900	,,	Aug. 12	7½	7½	Brighton, &c., 6 p.c. Con. ...	170—175	...	174
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	156—161	...	...
205,500	,,	,,	6	6	Do. 6 p.c. B. Pref.	142—147	...	...
1,487,500	,,	July 8	5	5	Bristol, 5 p.c. max.	120—122*a*	...	...
120,420	,,	June 7	4	4	Do. 1st 4 p.c. Deb. ...	102—104*a*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	101—103*a*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	127—130*a*	...	...
855,000	,,	Sept. 23	8	7	British Ord.	152—157	...	154
100,000	,,	June 7	7	7	Do. 7 p.c. Pref.	160—165	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. "B" Cum. Pref.	112—117	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	109—114	...	...
200,000	,,	,,	...	17/6⅔	Do. 3½ p.c. Red. Deb. ...	99—101	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1—3	...	...
150,000	Stk.	June 24	4½	4½	Do. 4½ p.c. Deb. ...	83—88	...	85½—86½
626,860	,,	July 22	6	6	Cardiff Con. Ord.	127—132	...	...
237,860	,,	June 7	5	5	Do. 5 p.c. Red. Deb.	107—112	...	...
157,150	,,	Aug. 12	6½	5	Chester 5 p.c. Ord.	109—114*b*	...	...
98,936	1	Sept. 23	2/-	2/-	Colombo, Ltd., Ord.	1⅝—1⅞	...	...
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	20/—22/	...	...
609,204	1	Oct. 7	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	19/6—21/6*	—/6	...
296,053	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	24/6—26/6*	—/6	...
1,775,005	Stk	Aug. 12	6	5	Commercial Ord.	100—105	...	102—105
620,000	,,	June 7	3	3	Do. 3 p.c. Deb. ...	83—88	−2	86
286,344	,,	Aug. 12	5	5	Do. 5 p.c. Deb. ...	121—126	...	...
807,560	,,	Aug. 12	7	7	Croydon sliding scale... ...	151—156	...	153—154
569,590	,,	,,	5	5	Do. max. div.	113—118	...	115—116½
620,385	,,	June 24	5	5	Do. 5 p.c. Deb.	123—128	...	125
542,270	,,	Aug. 12	10	7	Derby Con.	175—185*c*	...	...
55,000	,,	June 24	4	4	Do. 4 p.c. Deb.	100—105*c*	...	...
239,000	,,	Aug. 12	5	5	East Hull Ord. 5 p.c.	109—112	...	...
181,625	,,	Aug. 12	6	6	East Surrey Ord 5 p.c. ...	129—134	...	...
175,609	,,	June 7	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
19,313,481	,,	Aug. 12	5½	5½	Gas Light & Coke 4 p.c. Ord.	25/9—26/9*f*	...	25/10½—26/7½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	88—92	...	88½—91
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	105—108	...	105½—107½
8,602,497	,,	June 7	3	3	Do. 3 p.c. Con. Deb. ...	84—88	−1	84—86
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	114—118	...	114
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	112—116	...	113—114½
270,466	,,	Aug. 12	6	6	Harrogate New Cons. ...	132—137	...	...
140,000	1	Sept. 23	1/7½	1/7½	Hongkong & China, Ltd. ...	1¼—1½	...	...
213,200	Stk.	Aug. 12	6	6	Hornsey Con. 3½ p.c.... ...	130—135	...	...
5,600,000	,,	May 13	10	14	Imperial Continental Cap. ...	208—213	+3½	209—213
223,130	,,	July 22	3½	3½	Do. 3½ p.c. Red. Debs.	91—96	...	...
285,242	,,	Aug. 12	8½	8½	Lea Bridge 5 p.c. Ord. ...	175—180	...	...
2,167,410	,,	Aug. 12	6	6	Liverpool 5 p.c. Ord.... ...	132—134*b*	−1	...
245,500	,,	June 7	5	5	Do. 5 p.c. Red. Pref. ...	105—110*b*	...	...
306,083	,,	July 8	4	4	Do. 4 p.c. Deb.	105—107*b*	...	...
165,736	,,	Aug. 26	10	8	Maidstone 5 p.c. Cap. ...	182—192	...	...
63,480	,,	June 24	3	3	Do. 3 p.c. Deb. ...	82—87	...	...
75,000	,,	May 27	†10	†10	Malta & Mediterranean ... Metropolitan (of Melbourne)	210—220	...	...
392,000	—	Oct. 1	5½	5½	5½ p.c. Red. Deb.	98—103	...	...
231,978	Stk.	Aug. 12	5	5	M. S. Utility "C" Cons. ...	108—113	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	101—106	...	...
360,075	,,	June 24	4	4	Do. 4 p.c. Deb. ...	103—108	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	123—128	...	...
125,000	—	July 1	3½	3½	Do. 3½ p.c. Rd. Rg. Bds.	97—100	...	...
675,000	,,	June 24	†3	†3	Montevideo, Ltd.	48—53	...	48
2,061,313	,,	Aug. 12	5⅝	5	Newcastle & Gateshead Con.	25/—26/-*df*	—/6	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	107—108*d*	...	...
776,706	,,	June 7	3½	3½	Do. 3½ p.c. Deb. ...	100½—101½*d*	...	...
277,285	,,	Oct. 8	5	5	Do. 5 p.c. Deb. '43 ...	105—107*d*	...	...
274,000	,,	Aug. 12	5	5	Newport (Mon.) 5 p.c. max....	113—118*a*	...	...
225,000	,,	Aug. 12	7½	7½	North Middlesex 6 p.c. Con.	162—172	...	...
396,160	,,	Aug. 12	5	5	Northampton 5 p.c. max. ...	105—110	...	...
300,000	,,	Apl. 29	†9	†7	Oriental, Ltd.	160—170	...	...
416,617	,,	June 7	8	8	Plym'th & Stonehouse 5 p.c.	162—167	...	...
504,416	,,	Aug 12	8½	8½	Portam'th Con. Stk. 4 p.c. Std.	172—177	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	110—115	...	...
114,000	,,	July 22	5	5	Preston 5 p.c. Pref.	106—111	...	...
321,961	1	Sept. 23	...	1.-	Severn Val. Gas Cor. Ld. Ord.	22/—23/-	...	...
319,510	1	,,	...	-/10½	,, ,, 4½ p.c. Cum. Pref.	21/9—22/9	...	22/3
1,736,968	Stk.	Aug. 26	6	6	Sheffield Cons.	139—141*e*	−1	...
95,000	,,	June 24	4	4	Do. 4 p.c. Deb.	102—104*e*	...	...
133,201	,,	Aug. 12	5	8½	Shrewsbury 5 p.c. Ord. ...	145—150	...	...
90,000	10	May 27	‡3	‡3½	South African	3—4	...	...
1,061,779	1	Sept. 23	1/2⅛	1/2⅛	South East'n Gas Cn. Ld. Ord.	28/—29/-	...	28/-
845,016	1	,,	-/10½	-/10½	Do. 4½ p.c. Red. Cum. Pref.	22/3—23/3	...	...
450,000	Stk.	Aug. 12	4	4	Do. 4 p.c. Red. Deb. ...	100—103	...	...
6,709,895	,,	Aug. 12	6½	5	South Met. Ord.	120—125	...	120—122¾
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf. ...	147—152	...	149—150
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf. ...	105—109	...	106½—107½
1,895,445	,,	June 24	3	3	Do. 3 p.c. Deb. ...	84—88	−1	84½
1,000,000	,,	July 8	5	5	Do. 5 p.c. Red. Deb....	114—117	...	...
209,820	,,	Aug. 12	8½	8½	South Shields Con.	171—173*d*	...	...
1,543,795	,,	Aug. 12	6	6	South Suburban Ord 5 p.c. ...	126—131	...	...
512,825	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	121
500,000	,,	,,	4	4	Do. 4 p.c. Pref. ...	103—108	1	...
888,587	,,	June 7	5	5	Do. 5 p.c. Deb. ...	123—128	...	125
250,000	,,	,,	4	4	Do. 4 p.c. Deb. ...	105—110	...	...
647,740	,,	Aug. 12	5	5	Southampt'n Ord. 5 p.c. max.	115—120	...	116
121,275	,,	June 7	4	4	Do. 4 p.c. Deb.	100—105	...	...
350,000	,,	Aug. 12	5½	5½	Swansea 5½ p.c. Red. Pref. ...	112—117	−1	112
200,000	,,	June 7	6½	6½	Do. 6½ p.c. Red. Deb. ...	98—103	...	...
1,076,490	,,	Aug. 12	6½	6½	Tottenham and District Ord.	149—154	...	150—151
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	130—135	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
334,615	,,	June 7	4	4	Do. 4 p.c. Deb. ...	101—106	...	...
369,774	,,	Aug. 12	7	7	Uxbridge, &c., 5 p.c.	151—156	...	152
108,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	118—123	...	...
1,326,700	,,	Aug. 12	7	7	Wandsworth Consolidated ...	155—160	...	160
1,371,373	,,	,,	5	5	Do. 5 p.c. Pref. ...	121—126	+1	124½—125½
1,317,964	,,	June 7	5	5	Do. 5 p.c. Deb. ...	125—130	...	127
338,300	,,	,,	4	4	Do. 4 p.c. Deb. ...	105—110	...	...
158,400	,,	Aug. 12	6*g*	5	Winchester W. & G. 5 p.c. Con.	114—119	...	...

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